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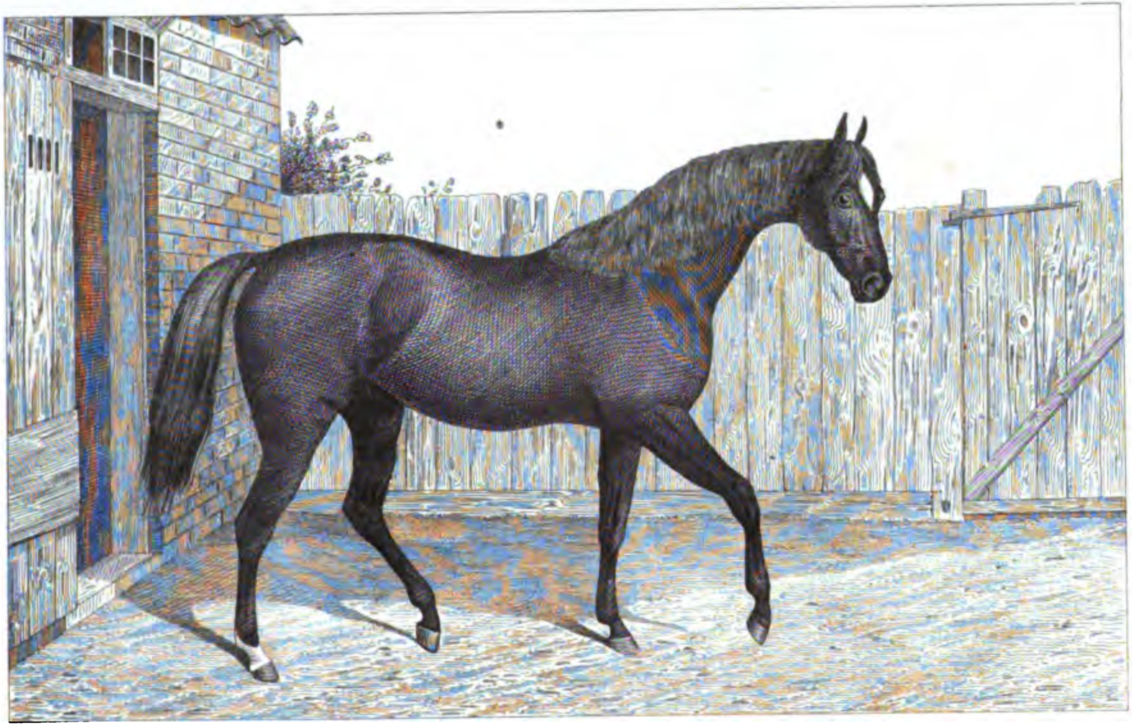

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REPORT

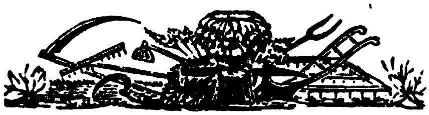
OF THE

TRANSACTIONS

OF THE

Pennsylvania State Agricultural Society,

FOR THE YEARS 1864-'65-'66-'67-'68-'69-'70.



VOLUME VII.

HARRISBURG:
B. SINGERLY, STATE PRINTER.
1871.

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TO THE READER.

This volume, the seventh of the "Transactions of the Pennsylvania State Agricultural Society," is issued under authority of an act of Assembly, passed at the session of 1871. It includes a period of seven years, and embraces only a selection from the numerous interesting and useful papers of the Society. It was found impossible to publish the whole of them, as the act authorizing this publication required that the journal of the Society should be made public, and also that certain portions of the proceedings of the Pennsylvania Agricultural College, and of the State Fruit Growers' Society, should be included. Under these circumstances, to have given the entire collection of the Society would have formed a volume of unusual compass. The accumulation of papers has, therefore, been condensed as much as practicable, and, it is hoped, embraces all that will tend to show the progress of Agriculture under the auspices of the Society and its kindred organizations.

The Society is under obligations to several gentlemen for their contributions of special papers. It is to be regretted that papers upon subjects of great importance to the interests of agriculture, assigned to gentlemen in various parts of the State, were not completed in season for publication. This is the more unfortunate, as a portion of them are upon themes that particularly concern the citizens of Pennsylvania at large, as well as the farmer who might be especially profited by their publicity. The great want of Pennsylvania is a system of industrial statistics. These are of record in the sixty-three counties of the State, but a report of their contents, either in whole or in part, is not made to any single officer of the Commonwealth. An effort to organize a system whereby these statistics may be concentrated and compiled, and which need not necessarily be an expensive one, should be directed by the Legislature; and the expectation of the State Society is that it will not be long before a commencement is made to render such important and desirable information accessible to all, in an authoritative form.

Some delay in preparation has been unavoidable, owing to causes entirely beyond the control of the officers of the Society, to whom the arrangement and preparation of this volume has been entrusted.

HARRISBURG, *June*, 1871.

CONSTITUTION AND LIFE MEMBERS

OF THE

Pennsylvania State Agricultural Society.

The Pennsylvania State Agricultural Society was created a "a body corporate" by the Legislature, on the 29th day of March, 1851. The act at large can be found in the statutes for 1851, and in previous volumes of the transactions of this society. The society sprung from a meeting held at Harrisburg, on the 21st of January, 1851, in which all the counties of the State were represented. On the 22d the meeting had taken the form of a society, electing its first president and officers. On the 20th of January, 1852, it held its first annual meeting at Harrisburg, where, in the previous September, its first exhibition had been held, with a good degree of encouragement. Exhibitions have since been held at Lancaster, Pittsburg, Philadelphia, Harrisburg, Wyoming, Norristown, Williamsport, Easton and Scranton, with varying success, but always doing something toward developing the agricultural resources of the State.

The concerns of the society are entrusted to an Executive Committee, consisting of a president, twenty-four vice presidents, one from each of the Congressional districts into which the State is divided, five additional members, all the ex-presidents, a corresponding and a recording secretary, a treasurer, a chemist and geologist, and a librarian, in all, as at present constituted, a committee of forty.

The constitution has been frequently, but not substantially, amended since its original adoption in 1852, and now stands as it is given herewith. A list of life members is embodied in this issue. It has been impossible to preserve a necrological register, and therefore lapses by death are not noted. The list comprises the names of all life members previously to the first January, 1871; a total of 788 names, representing all parts of the State.

CONSTITUTION OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

The name of the Society shall be the Pennsylvania State Agricultural Society. The objects of this society are to foster and improve agriculture, horticulture and the domestic and household arts.

WHO ARE MEMBERS.

SECTION 1. The society shall consist of all such persons as shall pay to the Treasurer not less than two dollars, and annually thereafter not less than two dollars; and also of honorary and corresponding members; the names of the members to be recorded by the Secretary.

The officers of county agricultural societies in this State, or delegations therefrom, shall be members *ex-officio* of this society.

The payment of twenty dollars shall constitute life membership, and exempt the members so contributing from all annual payments.

OFFICERS.

SECTION 2. The officers of the society shall be a President, a Vice President from each Congressional district, three-fourths of whom shall be practical agriculturists, or horticulturists, a Treasurer, a Corresponding Secretary, a Recording Secretary, a Librarian, an Agricultural Chemist and Geologist, and such assistants as the society may find essential to the transaction of its business; an executive committee, consisting of the above named officers, five additional members, with the ex-presidents of the society.

OF THE PRESIDENT.

SECTION 3. The President shall have a general superintendence of all the affairs of the society. In case of the death, illness or inability of the President to perform the duties of his office, the executive committee shall select a Vice President to act in his stead, who shall have the same power and perform the same duties as the President, until the next annual meeting.

OF THE VICE PRESIDENTS.

It shall be the duty of the Vice Presidents to take charge of the affairs of the association in their several districts; to advance all its objects; to call upon farmers to report as to the condition of agriculture in their neighborhood; to ask for information as to the modes of cultivation adopted by different farmers; and as far as in their power to make known the resources of their districts, the nature of its soil, its geological character and all such matter as may interest farmers in every part of the State.

TREASURER.

The Treasurer shall keep an account of all moneys paid into his hands, and shall pay bills when audited and approved by the executive committee; each order for payment must be signed by the President or chairman of the executive committee.

CORRESPONDING SECRETARY.

The duty of this officer shall be to invite a correspondence with all parsons interested in agriculture, whether in the State of Pennsylvania or elsewhere, but especially with our consuls in foreign countries, that new seeds, vegetables or live stock may be introduced, and their fitness for cultivation and propagation in our climate be tested. At each stated meeting of the society he shall read his correspondence, which shall, either the whole or such parts as may be selected by the society, form a portion of the transactions. He shall also correspond with the president or other officers of each State society in the United States, at least twice in the year, for purposes of combined and mutual action, and to be informed of the result and progress of each other's efforts; also, to invite mechanics to forward models or implements for examination and trial.

RECORDING SECRETARY.

The Recording Secretary shall keep the minutes of the society and of the executive committee; at the close of each year he shall prepare for publication such parts of the minutes and transactions of the society as may be designated.

LIBRARIAN.

The Librarian shall take charge of all books, pamphlets, &c., belonging to the society, and shall act as curator to preserve seeds, implements, or whatever property the society may possess.

EXECUTIVE COMMITTEE AND QUORUM.

The Executive Committee shall transact the business of the society generally, and shall appoint, annually, at their first quarterly meeting, a Recording Secretary and Treasurer, fix their salaries, and require security from the Treasurer, if they deem it necessary; shall superintend and direct the publication of such of the reports and transactions as they may deem proper, and shall designate the time and places for annual exhibitions, regulate the expenditures, examine all accounts, and keep such general charge of the affairs of the society as may best promote its interests.

They shall select their own chairman, and meet quarterly, and at any other time when convened by the President; five members shall form a quorum.

They shall call special meetings of the society when necessary.

ANNUAL MEETING OF THE SOCIETY AND QUORUM.

SECTION 4. The society shall meet annually, on the third Wednesday of January, at Harrisburg, when all the officers of the society, not otherwise appointed, shall be elected by ballot for the ensuing year, and until another election. They shall also hold a general meeting at the time of the annual exhibition, and special meetings whenever convoked by the Executive Committee.

Fifteen members shall form a quorum for the transaction of business, but no member in arrears shall be entitled to the privileges of the society.

QUALIFICATIONS OF VOTERS.

SECTION 5. No annual member, hereafter, shall be entitled to vote for the election of officers of the Pennsylvania State Agricultural Society, unless he shall have been a member at the previous State fair, and in default of a State fair, then three months previous membership shall be necessary.

SECTION 6 No one shall be eligible to office hereafter, who has not obtained a right to vote under section five.

ALTERATION.

SECTION 7. This constitution may be altered or amended, at the annual meetings in January, by a vote of two-thirds of the members in attendance.

LIFE MEMBERS.

Austin, John B., Philadelphia.
Alibone, Thomas, Philadelphia.
Allen, Josiah J., Philadelphia.
Anspach, J., Jr., Philadelphia.
Armstrong, James. Williamsport.
Allen, Robert P., Williamsport.
Andrus, D. S., Williamsport.
Allen, Charles, Williamsport.
Armstrong, William H., Williamsport.
Allen, John H., Montoursville.
Ayres, J. J., Williamsport.
Andrews, E., Williamsport.
Allen, Wm. H., Agricultural College.
Armstrong, W. H., Easton.
Ashbridge, E. B., Willistown Inn P. O.
Allen, John E., Middletown.
Alricks, William K., Harrisburg.
Allen, John F., Harrisburg.
Anderson, James, Hogestown.
Bucher, G. H., Hogestown, Cumb. county.
Biddle, Craig, Philadelphia.
Boal, George, Boalsburg.
Bryson, Robert, Carlisle.
Baldwin, M. W., Philadelphia.
Brock, Wm. Penn, Philadelphia.
Biddle, Alexander, Philadelphia.
Brown, George H., Philadelphia.
Boldin, George, Philadelphia.
Bard, Edwin Milford, Philadelphia.
Baxter, Issac B., Philadelphia.
Burnside, James, Bellefonte.
Benson, Alexander, Philadelphia.
Bonson, G. S., Philadelphia.
Bradford, Vincent L., Philadelphia.
Brown, John A., Philadelphia.
Billings, James B., Philadelphia.
Brown, David S., Philadelphia.
Baker, Elias, Altoona.
Brautigam, Daniel, Northumberland.
Brown, Jacob B., Columbia.
Bell, Samuel, Reading.
Bell, William, Mifflin.
Bennett, James, Pittsburg.
Beck, John B., Williamsport.
Bowman, Samuel, Wilkesbarre.
Breeze, N. W., Wyoming.
Barto, Tobias, Reading.
Bercaw. Abraham, Easton.
Berkenbine, Saml. A., Northumberland.
Blair, Horace, H., Williamsport.
Beard, Henry, Williamsport.
Beck, Samuel M., Williamsport.
Brown, James V., Williamsport.
Brown, Jacob, Newberry.
Berry, John J., Williamsport.
Bush, D. G., Bellefonte.
Butt, Charles H., Williamsport.
Bender, George H., Easton.
Blight, George, Germantown.
Boyd, T. S., Easton.
Brawdy, George, Sharpsburg.
Bergner, George, Harrisburg.
Bissell, William S., Pittsburg.
Bittenbender, Stephen, Shamokin.
Brown, G. W., M. D., Port Carbon.
Boyd, S. T., Easton.
Buehler, William, Harrisburg.
Boas, C. A., Harrisburg.
Bates, Abram, Harrisburg.
Bigler, Samuel S., Harrisburg.
Bomberger, Jacob C., Harrisburg.
Boyer, W. W., Harrisburg.
Briggs, John H., Harrisburg.
Boas, D. D., Harrisburg.
Bird, Joseph, Northumberland.
Buehler, Charles, Harrisburg.
Barr, W., Dr., Harrisburg.
Baily, Charles L., Pottstown.
Brown, James C., New Greenville.
Bound, David T., Kingston.
Cameron. Simon, Middletown.
Curwin, John, Harrisburg.
Chambers. Andrew R., Philadelphia.
Christian, S. J., Philadelphia.
Campbell, Hugh, Philadelphia.
Campbell, James R., Philadelphia.
Cadwallader, George, Philadelphia.
Colkit, C., Philadelphia.
Craig, Hugh, Philadelphia.
Carpenter, George W., Jr., Germantown.
Campbell, Thompson, San Francisco, Cal.
Cassiday, Joseph A., Philadelphia.
Clark, Edward S., Philadelphia.
Carmalt, S., Friendsville, Susquehanna co.
Cresson, John C., Philadelphia.
Carlisle, Robert M., Philadelphia.
Cornell, Adrian, Newtown, Bucks co.
Campbell, William S., Philadelphia.
Cowden, J. B.. Northumberland.
Chess, Moses, Temperanceville.
Colder, William, Harrisburg.
Conyngham, John N., Wilkesbarre.
Carson, George N., Norristown.
Cake, Jos. W., Northumberland.
Colder, James, Rev., Harrisburg.
Clymer, Hiester, Reading.
Conner, Joseph P., Fowlersburg.
Crans, Samuel M., Williamsport.
Campbell, John R., Williamsport.
Clark, James, Williamsport.
Clay, M. L., Williamsport.
Coleman, Fletcher, Williamsport.
Canfield, Ezra, Williamsport.
Campbell, E. B., Jersey Shore.
Cummings, R. D., Bellefonte.
Claydon, William, Pine Grove.
Cramer, Jacob, Uniontown.
Carter, William N., Jersey Shore.
Coryell, John B., Williamsport.
Crawford. A. S., Williamsport.
Colton, Henry, Williamsport.
Coder, N. B., Williamsport.
Capron, E. W., Williamsport.
Calvin, Otis P., N. Y. City, No. 234, Broadway.
Carpenter, E. P., Pittsburg.
Cummings, A. B., Philadelphia.
Charles, J. S., Pittsburg.
Cluley, William, Pittsburg.
Coburn, J. P., Aaronsburg, Centre co.
Crawford, M. H., Philadelphia.
Child, S. S., Harrisburg.
Commings, Charles, Harrisburg.
Colestock, Jacob M., Harrisburg.

Colestock, Samuel H., Harrisburg.
Cassel, Jacob, Harrisburg.
Crisswell, J. Vance, Harrisburg.
Coover, John B., Mechanicsburg.
Cameron, J. D., Harrisburg.
Chrisman, R. R., Harrisburg.
Callahan, George, Philadelphia.
Connelly, John, Hyde Park.
Darlington, J. Lacy, West Chester.
Davis, Atlee G., Philadelphia.
Dettry, Henry F., Philadelphia.
Dickey, E. V., Oxford.
Derbyshire, A. J., Philadelphia.
Durar, Enoch, Philadelphia.
Dallett, John, Philadelphia.
Devereaux, John, Philadelphia.
Devereaux, James, Philadelphia.
Deal, Daniel, Philadelphia.
Dasher, David, Harrisburg.
Drinker, H., Montrose.
Driesbach, Daniel G., Beach Haven.
Davis, William L., Easton.
Dœbler, V. S., Williamsport.
Dunlap, H, E., Newberry.
Davis, John L., Newberry.
Du Bois, John, Williamsport.
Datesman, Robert, Milton.
De Haven, Jehu, Harrisburg.
Dempster, Robert, Phillipsburg, N. J.
Duncan, J. L., M. D., Pittsburg.
Demees, John, Shamokin.
Darlington, H., Pittsburg.
Davis, Joseph H., Pittsburg.
Dull, J. J., Harrisburg.
Dougherty, James D., Harrisburg.
Dougherty, Daniel, Harrisburg.
Deitz, George A., Chambersburg.
Du Barry, J. N., Harrisburg.
Eli, Richard E., Philadelphia
Evans, David, Philadelphia.
Edwards, William A., Philadelphia.
Ellis, William, Philadelphia.
Evans, John, York.
Elwyn, A. L., Philadelphia.
Eby, Jacob R., Harrisburg.
Eichbaum, William, Pittsburg.
Eberly, Christian, Cumberland.
Everhart, J. T., Pittston.
Engle, Charles K., Bustleton.
Ellis, B. Morris, Hughesville.
Earley, Martin, Palmyra.
Eddy, George W., Philadelphia.
Ensworth, L. A., Williamsport.
Eves, George S., Williamsport.
Embick, Frederick E., Williamsport.
Eldred, Charles D., Williamsport.
Elder, Mathias, Williamsport.
Edwards, Charles, Williamsport.
Elliot, William G., Williamsport.
Eveland, S. D., Williamsport.
Evender, Thomas, Williamsport.
Epes, William J., Williamsport.
Elser, D. B., Williamsport.
Eckert, Isaac, Reading.
Eves, Andrew, Muncy.
Elder, James, (Swatara,) Harrisburg.
Elliott, B. A., Pittsburg.
Elliott, W. R., Pittsburg.
Estep, J. P., Pittsburg.
Etter, B. F., Harrisburg.
Emminger, John, Hogestown.
Early, D. S., Hummelstown.
Egle, W. H., M. D., Harrisburg.
Ensminger, J. T., Harrisburg.
Emminger, W. H., Harrisburg.
Edwards, Oliver, Harrisburg.
Freas, P. R., Germantown.
Frantz, Jacob, Mount Hope, Lancaster co.
Fotterall, Stephen G., Philadelphia.
Foster, Frank T., Philadelphia.
Fales, George, Philadelphia.
Fallon, Christ'er, U. Darby, Delaware co.
Flenniken, J. C., Waynesburg, Greene co.
Felton, S. M., Philadelphia.
Fulton, Andrew, Pittsburg.
Firmstone, William, Easton.
Fleming, Robert, Williamsport.
Fessler, Philip, Williamsport.
Foresman, Robert M., Williamsport.
Fisher, John S., Williamsport.
Foresman, D. W., Williamsport.
Foresman, John, Williamsport.
Foresman, Daniel F., Slifer, Union co.
Foresman, R. S., Williamsport.
Fuller, J. W., Montoursville.
Farrell, John, Pittsburg.
Fass, G., Allegheny city.
Frisch, B., Harrisburg.
Fisler, J. E., Harrisburg.
Fisler, Amos, Harrisburg.
Fleming, Dr. James, Harrisburg.
Flickinger, Samuel, Harrisburg.
Fisher, John R., Harrisburg.
Fox, Richard, Hummelstown.
Feeman, Valentine, Harrisburg.
Fellowes, J. Turney, Scranton.
Fiske, A. R., Harrisburg.
Gowen, James, Mount Airy, Philadelphia.
Grout, H. T., Philadelphia.
Gries, John M., Philadelphia.
Grigg, John, Philadelphia.
Grigg, John Warner, Philadelphia.
Glass, Alex. F., Philadelphia.
Garber, Jacob B., Columbia.
Gillespie, James, Philadelphia.
Gould, J. E., Philadelphia.
Gross, Daniel W., Harrisburg.
Gilbert, Henry, Harrisburg.
Gardner, Jacob, Pittsburg.
Goe, John S., Brownsville.
Goe, John S., Jr., Brownsville.
Gould, Stephen, Williamsport.
Gould, John, Luzerne county.
Gehr, D. O., Chambersburg.
Garis, David, Easton.
Gilmore, Joseph, Williamsport.
Grier, James, Newberry.
Gibson, C. E., Williamsport.
Gould, Robert S., Williamsport.
Gibson, John, Williamsport.
Garman, Samuel, Williamsport.
Gould, Alexander S., Hickory Run, Lycoming county.
Gregg, Theodore, Bellefonte.
Guernsey, H. A., Philadelphia.
Gaynor, Edward J., Easton.
Greenawalt, Alex., Allegheny city.
Glenn, John M'Donald, Pittsburg.
Glenn, Robert W., Noblestown.
Grove, M. M., Harrisburg.
Gobl, A., Harrisburg.
Garman, John, Hyde Park.
Griffin, Henry, Scranton.
Germyn, John, Rushdale.
Gibbs, J. W., M. D., Hyde Park.
Gregory, J. W., Scranton.

Griest, Chas. W., York Sulphur Springs.
Haldeman, Jacob S., New Market.
Hiester, A. O., Harrisburg.
Hutchinson, J. Pemberton, Philadelphia.
Hickok, W. O., Harrisburg.
Hacker, William, Philadelphia.
Harvey, Chalkley, Chaddsford.
Haseltine, John, Philadelphia.
Hart, William H., Philadelphia.
Hoopes, Thomas P., Philadelphia.
Hamilton, A. Boyd, Harrisburg.
Hoffman, H. W., Harrisburg.
Haldeman, Jacob M., Harrisburg.
Haddock, D., Jr., Philadelphia.
Hall, George E., Philadelphia.
Hiester, F. A. M., Reading.
Hæhnlen, Frederick, Harrisburg.
Hoffer, John, Harrisburg.
Hamilton, Hayes, Huntingdon Furnace.
Haldeman, S. S., Columbia.
Hicks, James, Pittston.
Hutchins, Thomas, Wyoming.
Harvey, E. B., Wilkesbarre.
Hollenback, George M., Wilkesbarre.
Hitner, Henry S., Barren Hill.
Holstein, Wm. H., Bridgeport.
Hartranft, Samuel E., Norristown.
Hæhnlen, Jacob, Harrisburg.
Hackett, J. M., Easton.
Hetrich, Josiah P., Easton.
Hutter, Wm. H., Easton.
Hartman, John, Williamsport.
Hartman, Matthias, Catawissa.
Herdic, Peter, Williamsport.
Hill, Theodore, Williamsport.
Hall, John B., Williamsport.
Hudson, Joseph E., Williamsport.
Hagerman, Augustus H., Williamsport.
Heidler, David, Williamsport.
Holden, H. L., Williamsport.
Hays, J. W., Williamsport.
Huling, Louis G., Williamsport.
Hinkle, John R., Newbury.
Higgins, William C., Williamsport.
Huyck, George, Newberry.
Hull, Joseph F., Hull's Mill.
Hepburn, Andrew, Williamsport.
Harinton, Thomas L., Williamsport.
Heylmun, E. G., Crescent, Lycoming co.
Howel, A., Williamsport.
Howland, Ransford, Williamsport.
Hastings, H. S., Williamsport.
Holliday, B. B., Wellsboro'.
Hepburn, John, Williamsport.
Hagy, Philip, Williamsport.
Hull, W. R., Cogan Station.
Hise, Adam, Williamsport.
Hamilton, Cyrus E., Williamsport.
Hoffman, Philip, Williamsport.
Hester, Joseph M., Easton.
Helick, Reuben, Easton.
Higgins, William V., Williamsport.
Hemingway, E. E., Easton.
Hugus, P., Pittsburg.
Hale, James P., Osceola, Clearfield county.
Higgins, William V., Williamsport.
Herr, Henry, Harrisburg.
Hummel, Richard H., Harrisburg.
Hummel, William, Harrisburg.
Hickman, Amos T., Monticello, Illinois.
Hynicka, George, Harrisburg.
Hummel, S. A., Harrisburg.
Hæhnlen, William F., Harrisburg.
Hamilton, Hugh, Harrisburg.
Hargest, William E., Harrisburg.
Hostick, John, Harrisburg.
Herr, D. S., Harrisburg.
Hummel, Alfred, Harrisburg.
Hall, John W., Harrisburg.
Heck, Lewis, M. D., Dauphin.
Hamilton, T. A., Harrisburg.
Hain, George, Lower Paxton, Dauphin co.
Hoffman, H. B., Millersburg.
Hunter, George W., Harrisburg.
Hutchison, J. W., Harrisburg.
Hildrup, W. T., Harrisburg.
Halstead, N., Scranton.
Hill, J. F., Scranton.
Halstead, W. F., Scranton.
Ingersoll, Harry, Philadelphia.
Irwin, James, Philadelphia.
Innis, John A., Easton.
Jordan, John, Philadelphia.
Jefford, A. M., Wyoming.
Jenkins, G. S., Wyoming.
Jenkins, Steuben, Wyoming.
Jones, Daniel, Exeter, Luzerne county.
Jessup, William H., Wilkesbarre.
Jackson, Geo. D., Dushore, Sullivan co.
Johnston, William, Easton.
Jones, John E., Williamsport.
Jarret, John, Hepburn, Lycoming co.
Jones, Samuel, Williamsport.
Jamison, Edward, Newberry.
Jamison, L., Williamsport.
Jeter, Tinsley, Bethlehem.
Jones, B. F., Pittsburg.
Jordan, Thomas J., Harrisburg.
Kapp, Amos E., Northumberland.
Kramer, Philip, Philadelphia.
Keim, George M., Reading.
Knight, William H., Philadelphia.
Kimball, Stephen, Philadelphia.
Kelly, Charles, Kellyville, Delaware co.
Knox, Thomas P., Norristown.
Knight, Edward C., Philadelphia.
Keller, John S., Orwigsburg.
Kunkle, Benjamin S., Harrisburg.
Knapp, D. B., Williamsport.
King, C. M., White Deer Mills, Centre co.
Kinyon, S. C., Williamsport.
Kunsman, William H., Easton.
Kelly, Dennis, Kellyville, Delaware co.
King, Alexander, Pittsburg.
Kreybill, Jacob E., Marietta.
Knipe, Joseph F., Harrisburg.
Koller, Henry M., Harrisburg.
Kuhn, William, Harrisburg.
Keely, Jerome, Union Deposit, Dauphin county.
Kirby, William C., Harrisburg.
Kepple, John, Harrisburg.
Kirkpatrick, J. D., North Liberty, Mercer county.
Kelker, Immanuel, Harrisburg.
Lukenbaugh, Chas Augustus, Bethlehem.
Longstreth, John, Bristol.
Lauman, George M., Harrisburg.
Laguerrene, P. L., Philadelphia.
Lancaster, J. B., Philadelphia.
Linn, Philip, Harrisburg.
Lafrance, Isaac T., Wyoming.
Lee, Washington, Jr., Wilkesbarre.
Leacock, J. R., Wyoming.
Longaker, A. Brower, Norristown.
Line, J. M., Allentown.

Lawall, Edward, Easton.
Lerch, Frederick, Easton.
Logan, Millard F., Williamsport.
Lowe, Ellis S., Williamsport.
Love, Samuel, Williamsport.
Lyon, Thomas, Williamsport.
Lippencott, Edward, Williamsport.
Lentz, George W., Williamsport.
Lehman, M., Williamsport.
Levan, E. M. D., Williamsport.
Long, Henry B., Pittsburg.
Long, W. J., Osceola, Clearfield co., Pa.
Lamberton, Robert A., Harrisburg.
Lauer, Fred'k W., Reading.
M'Allister, H. N., Bellefonte.
Marshall, William, Bellefonte.
Meredith, James M., West Chester.
M'Kinley, Isaac G., Harrisburg.
Miles, James, Girard, Erie county
M'Ilvaine, Abram R., Brandywine Manor, Chester county.
M'Gowan, John, Bridesburg, Philadelphia county.
Murdock, John, Jr., Pittsburg.
Myers, Jos. B., Philadelphia.
Mellor, Thomas, Philadelphia.
Mellon, Thomas, Philadelphia.
Magee, James, Philadelphia.
M'Cully, Francis G., Philadelphia.
Messchart, H., Philadelphia.
M'Kean, H. P., Philadelphia.
M'Kean, Samuel M., Williamsport.
Martin, George H., Philadelphia.
M'Crea, William H., Philadelphia.
M'Intyre, Peter, York.
M'Farland, John, Ligonier.
Middleton, E. P., Philadelphia.
Magee, George, Philadelphia.
Muhlenberg, H. H., Reading.
Murray, Wm. F., Harrisburg.
M'Allister, Archibald, Springfield Furnace, Blair county.
Metzgar, Wm., Harrisburg.
Murdock, A. C., Pittsburg.
Merrick, George, Northumberland.
M'Allister, John C., Fort Hunter, Dauphin county.
Maxwell, Henry D., Easton.
Myers, Henry, Forty Fort.
Marcy, Ira, Wilkesbarre.
M'Crea, James A., Philadelphia.
Martin, Dewees J., Allentown.
Mutchler, John, Easton.
M'Minn, J. M., Williamsport.
Mudge, Hiram, Williamsport.
Munday, J. S., Williamsport.
M'Dowell, Lewis, Williamsport.
M'Cormick, Robert, Montoursville.
Moore, Wesley, Newberry.
Mahaffey, David, Cogan Station.
Mahaffey, Lindsey, Newberry.
M'Micken, J. B., Williamsport.
Miller, Larry, Wayne, Clinton county.
Mahaffey, William J., Newberry.
Maxwell, Jacob S., Williamsport.
Morse, H. S. Williamsport.
Montgomery, J. B., Williamsport.
Mundy, H. F., Williamsport.
Morrison, S. G., Williamsport.
Morris, John C., Friendsville.
M'Cauley, George W., Harrisburg.
Messinger, Samuel, Easton.
M'Cain, Daniel, Allegheny city.
M'Kelvy, James, Wilkinsburg, Allegheny county, Pa.
Morris, D. B. Pittsburg.
M'Pherson, J. S., Wilkins.
M'Nish, H. L., Pittsburg.
Marchand, John, Pittsburg.
Magan, David, New Brighton. Beaver co.
M'Farland, John, Northumberland.
Montgomery, Joseph, Harrisburg.
Matter, John, Harrisburg.
Mark, Geo. M., Harrisburg.
Middleton, Richard, Harrisburg.
Miller, William H., Harrisburg.
Mumma, David, Harrisburg.
M'Farland, Geo. F., Harrisburg.
M'Conkey, Elbridge, Harrisburg.
M'Donald, Lewis, Harrisburg.
M'Cormick, David, Harrisburg.
Miller, J. G., Harrisburg.
M'Cormick, James, Harrisburg.
Morse, L. W., Ledgedale, Wayne co., Pa.
Newbold, A. T., Philadelphia.
Neilson, Robert, Philadelphia.
Neff, Robert K., Philadelphia.
Newton, G. B., Springfield, Delaware co.
Noble, John, Carlisle.
Noble, F. W., Easton.
Nissley, John J., Hummelstown.
Nicely, George W., Newberry.
Nutting, Lyman, Pine Grove, Schuylkill co.
Nichols, Joseph, Williamsport.
Nichols, W. F., Williamsport.
Neiman, D. H., Easton.
Nissley, Joseph, Harrisburg.
Opp, George S., Mayland, Lycoming co.
Osthout, Jacob H., Harrisburg.
Odenwelder, Henry L., Easton.
Olwine, Benjamin, Harrisburg.
Ott, Leander N., Susquehanna.
Packer, William F., Williamsport.
Prichett, Borradaile, Frazier, Chester co.
Perot, W. S., Philadelphia.
Pennock, Samuel, Kennet Square, Chester county.
Pratt, Thomas, Philadelphia.
Pomeroy, John L., Philadelphia.
Peyson, Auguste, Philadelphia.
Patterson, Robert, Philadelphia.
Physic, Emlen, Philadelphia.
Presbury, Geo. G., Jr., Philadelphia.
Priestley, J. R., Northumberland.
Parsons, H. K., Harrisburg.
Peters, Benjamin G., Harrisburg.
Pennock, Joseph, Pittsburg.
Patterson, Robert H., Pittsburg.
Powel, Robert H., Philadelphia.
Paxton, Joseph, Catawissa.
Polen, Albert, Wyoming.
Peters, C. P., Concordville.
Potts, E. Channing, Norristown.
Parsons, Leroy, Harrisburg.
Pyle, R. C., Easton.
Purcell, Sylvester, Bloomsburg.
Parsons, Henry C. Williamsport.
Pratt, John, Williamsport.
Pollock, Samuel, Williamsport.
Porter, John F., Newberry.
Parker, Samuel J., Williamsport.
Perkins, H. J., Williamsport.
Perkins, James H., Lemar.
Page, A., Williamsport.
Post, G. S., Williamsport.
Parke, John E., Pittsburg.

Patterson, Lebanon Church, Allegheny co.
Phelps, W. H , Pittsburg.
Pemberton, Clifford, Pittsburg.
Phillips, John, Pittsburg.
Power, John, Harrisburg.
Parsons, George W., Harrisburg.
Rogers, C. B., Philadelphia.
Roberts, Algernon S., Philadelphia.
Rutherford, John P., Harrisburg.
Rice, John, Philadelphia.
Rice, William, Philadelphia.
Roberts, Isaac, Norristown.
Rudman, William C., Philadelphia.
Robeson, H. P., Robesonia, Berks county.
Rodgers, Fairman, Philadelphia.
Rhodes, William A., Philadelphia.
Ripka, Joseph, Philadelphia.
Remington, Thomas P., Philadelphia.
Ronaldson, Richard, Philadelphia.
Relf, C. P., Philadelphia.
Rutherford, S. S., Harrisburg.
Rutherford, Abner, Harrisburg.
Reily, John A., Harrisburg.
Robb, Jacob, Pittsburg.
Robinson, ——, Philadelphia.
Rutter, Nathaniel, Wilkesbarre.
Ross, Wm. S., Wilkesbarre.
Rutherford, John B., Harrisburg.
Ruggles, A. C., Williamsport.
Reighard, James B.. Newberry.
Reighard, Daniel, Newberry.
Renninger. W. H., Williamsport.
Rook, D. N., Williamsport.
Rank, L. D., Williamsport.
Rouse, William A., Harrisburg.
Reed, Alexander, Lock Haven.
Rodenbough, Joseph S., Easton.
Reeder, Mrs. A. H., Easton.
Richards, Henry, Easton.
Reigel, Joseph, Easton.
Roth, Jeremiah, Allentown.
Rogers, Felix, Pittsburg.
Rowley, Thomas A., Pittsburg.
Russell, Alex. L., Harrisburg.
Rogers, Lucius, Smethport, M'Kean co.
Raymond, James, Harrisburg.
Reel, Augustus, Harrisburg.
Rutherford, William S., Harrisburg.
Reel, John, Harrisburg.
Reed, James, Middle Paxton, Dauphin co.
Reichenbach, E. C., Harrisburg.
Rudy, Joseph, Harrisburg.
Rupp, Henry S., Shiremanstown, Cumberland county.
Rutherford, J. E., Harrisburg.
Rhey, Geo., Millwood, Westmoreland co.
Richmond, William H., Carbondale.
Rand, George W., Scranton.
Savery, Peleg B., Philadelphia.
Stambaugh, S. C., Lancaster.
Sergeant, William, Philadelphia.
Strouble, Jacob, Zion, Centre county.
Snow, Edward K., Philadelphia.
Sharp, Joseph W., Philadelphia.
Stavely, Wm., Lahaska, Bucks county.
Smith, Daniel, Jr., Philadelphia.
Smith, Thomas, Philadelphia.
Scull, Gideon, Philadelphia.
Simmons, A. H., Philadelphia.
Starr, Isaac, Philadelphia.
Shoemaker. B. A., Philadelphia.
Schaffer, W. L., Philadelphia.
Smith, Geo., Upper Darby, Delaware co.
Sheridan, Owen, Philadelphia.
Swift, Joseph, Philadelphia.
Struthers, William, Philadelphia.
Slade, Alfred, Philadelphia.
Stuart, George H., Philadelphia.
Small, Samuel, York.
Sharwood, Dendy, Philadelphia.
Stone, Daniel, Philadelphia.
Speer, Alexander, Pittsburg.
Stokes, William A., Greensburg.
Sturdevant, E. W., Wilkesbarre.
Shoemaker, Wm. M., Wyoming.
Sturdevant, E. J., Wyoming.
Speece, L. B., Wyoming.
Smith, J. B., Dunmore.
Shoemaker, Wm. S., Wyoming.
Schooley, J. B., Wyoming.
Smith, J. B., Plymouth.
Shoemaker, Elijah. Kingston.
Sharp, John, Jr.. Wyoming.
Stark, J. B., Wilkesbarre.
Stephens, Z., Scranton.
Sower, F. D., Norristown.
Schall, David. Norristown.
Schreiber, O. L., Laubach, Northamp'n co.
Sigman, Joseph. Easton.
Snyder, Daniel W., Easton.
Schreiner, J. W., Lewisburg.
Singer Manufacturing Co., Philadelphia.
Swan, Rufus C., Williamsport.
Sheffler, A. G.. Williamsport.
Smith, Henry B.. Williamsport.
Smith, Joseph W., Newberry.
Stearns, L. L., Williamsport.
Stewart, Robert, Lemar.
Showers, Jesse, Rauch Gap.
Smith, Thomas, Williamsport.
Showers, D. H., Williamsport.
Smith, Daniel W., Williamsport.
Saxton. J. O., New Kingston.
Shaw, Hugh, Jersey Shore.
Smith, J. D. L., Mill Hall.
Seltzer, George L., Myerstown.
Seitz, George, Easton.
Seitz, Frederick, Easton.
Serch, David, Easton.
Scott, John, Pittsburg.
Sharpless, S. J., Street Road, Chester co.
Smith, George, New York city.
Seiler, Daniel W., Harrisburg.
Shoemaker, John, Harrisburg.
Scheffer, Theodore, Harrisburg.
Smith, Jacob, Harrisburg.
Shaffer, William S., Harrisburg.
Simon, John B., Harrisburg.
Smull, John A., Harrisburg.
Shellenberger, Henry, Harrisburg.
Scott, George, Catawissa.
Sharp, Samuel W., Newville.
Sheck, J. H., Harrisburg.
Thompson, John I., Half Moon, Centre co.
Thomas, George, Belvidere, Chester co.
Thatcher, Richard, Marsh, Chester co.
Toppan, Charles, Philadelphia.
Thompson, N. B., Philadelphia.
Tatham, H. B., Philadelphia.
Tatham, George N., Philadelphia.
Towers, William H., Philadelphia.
Taggart, David, Northumberland.
Taggart, John, Northumberland.
Tasker, Thomas T., Philadelphia.
Tripp, Ira, Scranton.
Trout, Michael C., Sharon, Mercer co.

Tyson, Carrol S., Norristown.
Thomas, Henry, Harrisburg.
Templin, James P., Easton.
Taylor, Benjamin H., Williamsport.
Taylor, Horace E., Williamsport.
Thompson, James, Cogan Station.
Trump, Edward D., Jersey Shore.
Tinsman, Garrett, Williamsport.
Tinsley, Jeter, Bethlehem.
Thayer, Russell A., Allentown.
Templin, William, Harrisburg.
Taylor, William, Womelsdorf, Berks co.
Taylor, B. Frank, Womelsdorf.
Taylor, George R., Womelsdorf.
Urquehart, John, Wilkesbarre.
Updegraff, A., Wilkesbarre.
Updegraff, Thomas, Newberry.
Updegraff, Daniel, Newberry.
Updegraff, Derrick, Newberry.
Unger, David J., Harrisburg.
Unger, John G., Harrisburg.
Van Leer, Isaac W., Wallace, Chester co.
Vouges, James C., Philadelphia.
Vanvoorhis, H. B., Pittsburg.
Vanscoy, Daniel, Wyoming.
Van Vorce, John, Williamsport.
Van Buskirk, S., Williamsport.
Vandike, James, Northumberland.
Walker, George, Montrose.
Watts, Frederick, Carlisle.
Walker, R. C., Elizabeth, Allegheny co.
Wood, Robert, Philadelphia.
Waterman, Joseph, Philadelphia.
Wister, Richard, Philadelphia.
Watson, Johanna, Philadelphia.
Welsh, William, Philadelphia.
Welsh, John, Philadelphia.
Welsh, Samuel, Philadelphia.
Woodward, George W., Philadelphia.
Weaver, H. A., Pittsburg.
Wright, Joshua, Washington county.
Watson, A. W., Harrisburg.
Walters, S. H., Northumberland.
Wright, Joshua, Findleyville, Washington county.
Waterman, Albert G., Philadelphia.
Wood, Thomas, Penningtonville.
Woodhams, Samuel, Plymouth.
Williams, Stiles, Wilkesbarre.
Wright, H. B., Wilkesbarre.
Wetherill, William, Norristown.
Wentz, Thomas H., Norristown.
Witman, Joseph, Centre Valley P. O.
Williams, E. C., Harrisburg.
Woodward, John V., Williamsport.
Watson, Oliver, Williamsport.
White, Henry, Williamsport.
Wolf, Peter, Williamsport.
Wingard, Samuel C., Williamsport.
Watson, Henry W., Williamsport.
Weaver, M. B., Williamsport.
White, John, Williamsport.
Wait, B., Williamsport.
Wood, James M., Williamsport.
Westcott, Thos. S., Ashland, Schuylkill co.
Ward, C. L., Towanda.
Werkheiser, Enos, Easton.
Wallace, W. W., Pittsburg.
Withington, W. P., Shamokin.
Way, John, Jr., Pittsburg.
White, J. A. G., Osceola, Clearfield co.
Wallower, John, Harrisburg.
Winters, George, Harrisburg.
Woltinger, Levi, Harrisburg.
Wible, William, Gettysburg.
Watts, William M., Mechanicsburg.
Warford, A. B., Harrisburg.
Wolf, William, Harrisburg.
Yeager, Joseph, Philadelphia.
Young, Alexander, Philadelphia.
Yeaton, William H., Philadelphia.
Youngman, George W., Williamsport.
Young, William, Easton.
Young, John, Jr., Ewing's Mills, Allegheny county.
Young, James, Middletown.
Ziegler, John H., Harrisburg.
Zimmerman, F., Williamsport.
Zimmerman, A. M., Harrisburg.
Zerbe, Cyrus, Harrisburg.

OFFICERS OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY FOR 1871.

PRESIDENT.

John C. Morris, Scranton, Luzerne county.

VICE PRESIDENTS.

1. James A. M'Crea, De Lancy Place, Philadelphia.
2. George Blight, Philadelphia.
3. J. Brown Parker, Philadelphia.
4. James N. Marks, Philadelphia.
5. Oliver Landreth, Bristol, Bucks county.
6. William H. Holstein, Bridgeport, Montgomery county.
7. Dennis Kelly, Kellyville, Delaware county.
8. Tobias Barto, Reading, Berks county.
9. William L. Peiper, Lancaster, Lancaster county.
0. Martin Early, Palmyra, Lebanon county.
11. Daniel H. Neiman, Easton, Northampton county.
12. Daniel G. Driesbach, Beach Haven, Luzerne county.
13. George Scott, Catawissa, Columbia county.
14. John A. Smull, Harrisburg, Dauphin county.
15. John D. Bowman, Camp Hill, Cumberland county.
16. Calvin M. Duncan, Chambersburg, Franklin county.
17. John S. Miller, Huntingdon, Huntingdon county.
18. John J. Thompson, Martha Furnace, Centre county.
19. Lucius Rogers, Smethport, M'Kean county.
20. Joseph D. Kirkpatrick, North Liberty, Mercer county.
21. George Rhey, Millwood, Westmoreland county.
22. William S. Bissell, Pittsburg, Allegheny county.
23. John Murdoch, Jr., Pittsburg, Allegheny county.
24. James C. Shaw, Neshannock Falls, Lawrence county.

ADDITIONAL MEMBERS OF EXECUTIVE COMMITTEE.

Jacob R. Eby, Harrisburg, Dauphin county.
Benj. G. Peters, " "
George Bergner, " "
Abner Rutherford, " "
Michal C. Trout, Sharon, Mercer county.
Frederick Watts, Ex-President, Carlisle, Cumberland county.
James Gowen, Ex-President, Mt. Airy, Philadelphia county.
David Taggart, Ex-President, Northumberland, Northumberland co.
Jacob S. Haldeman, Ex-President, Harrisburg, Dauphin county.
Thomas P. Knox, Ex-President, Norristown, Montgomery county.
A. Boyd Hamilton, Ex-President, Harrisburg, Dauphin county.
Amos E. Kapp, Ex-President, Northumberland, Northumberland co

CORRESPONDING SECRETARY.

Elbridge M'Conkey, Harrisburg, Dauphin county.

RECORDING SECRETARY.

D. W. Seiler, Harrisburg, Dauphin county.

TREASURER.

John B. Rutherford, Harrisburg, Dauphin county.

CHEMIST AND GEOLOGIST.

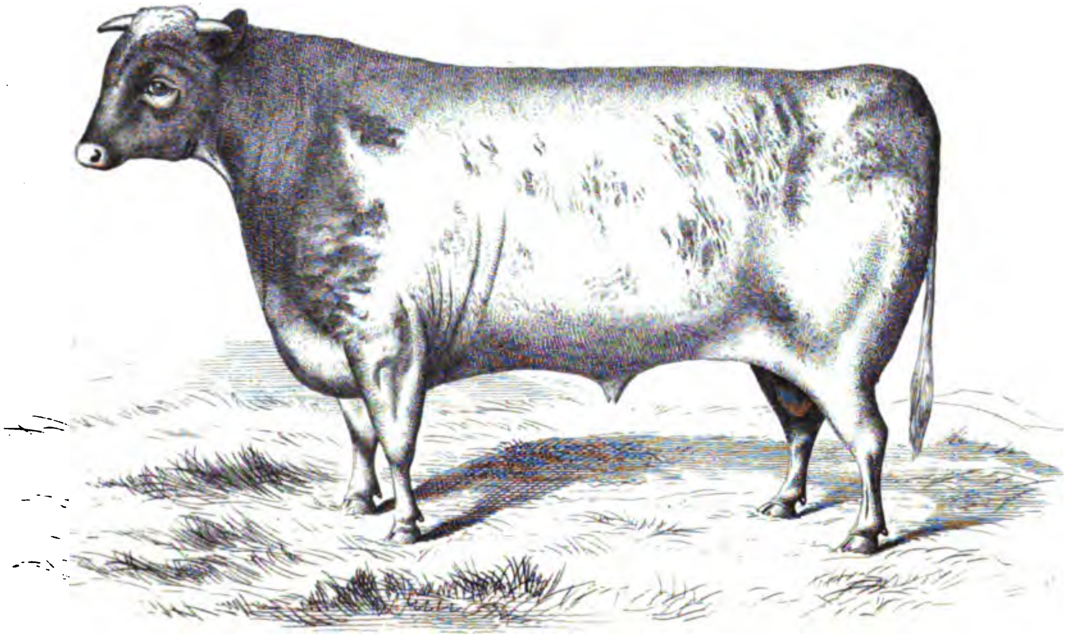
Samuel S. Haldeman, Columbia, Lancaster county.

ASSISTANT CHEMIST AND GEOLOGIST.

Hugh Hamilton, Harrisburg, Dauphin county.

LIBRARIAN.

William H. Egle, Harrisburg, Dauphin county.



IMPORTED SHORT HORN BULL
"PRINCE NICHOLAS"
Owned by Cooper & Nephew. Coopersburg, Pa.

Benj. Singerly Lith. Pittsbgh

MINUTES OF THE EXECUTIVE COMMITTEE.

HARRISBURG, *January* 18, 1864.

Fourth quarterly meeting of the Executive Committee.

Present—Messrs. M'Crea, Engle, Holstein, Barto, Driesbach, Jackson, Kapp, Ellis, Colder, Peters, Ziegler, Haldeman, Hamilton and Knox, *President.*

On motion of Mr. Kapp,

President Knox was called to the chair. The minutes of last meeting were read and approved.

On motion,

The essay of Robert M'Clure, V. S., of Philadelphia, on Veterinary Science, was referred to Committee No. 36, on agricultural productions, &c., with power to report thereon.

John H. Ziegler, Esq., the Treasurer, submitted his annual report, which was, on motion, referred to Messrs. Kapp, Hamilton and Driesbach, committee to audit and report thereon.

On motion of Mr. Hamilton,

The Treasurer was authorized to address a note to James E. Gowen, Esq., attorney-at-law, Philadelphia, in relation to the claim of the society against Conrad Bard & Son, upon a note of $591 61, dated January 17, 1860, and upon which judgment had been obtained, and if possible secure the collection of the same.

The Secretary laid before the Committee letters from Ex-Presidents Gowen and Watts, and J. B. Garber, regretting their inability to attend the meeting, and expressing their best wishes for the success and prosperity of the society.

The Secretary also laid before the Committee a communication from H. M. Wetherill, stating that the judges upon gaited horses had not awarded the premiums as designated in said class, and requesting the Executive Committee to take action in relation to the awarding the same;

When upon motion, it was

Ordered, That the Secretary answer said communication, by informing Mr. Wetherill that the Executive Committee have no disposition nor sufficient data, whereby to review the action of the Judges.

On motion of Mr. Kapp, it was

Ordered, That a Diploma be granted to Robert Maxwell, Esq., of the Gap, Lancaster county, for his thorough-bred stallion "Grey Diomede," captured from the rebel general Cheatham, in 1862, and exhibited at the last Fair.

On motion of Mr. Ellis, it was

Ordered, That the expenses of each member attending this quarterly meeting, be paid by the Treasurer, on the presentation of his bill; this order, however, not to extend to any subsequent meeting.

On motion of Mr. Kapp,

The President and Secretary were directed to address a note to the officers of the different railroad companies, and respectfully request the favor of a pass for each member of the Committee, during the time of holding the quarterly meetings.

On motion of Mr. Kapp, it was

Resolved, That the expenses of the President incurred for traveling, postage, lodging, &c., when on the business of the society, shall be paid on presentation, by the Treasurer.

On motion of Mr. Kapp, it was

Ordered, That the Secretary be authorized to procure a printed circular, to be directed to the commissioners of each county, calling their attention to the clause in our charter, requiring each county society to report to the State Society annually, and requesting them to withhold the annual county appropriation until the president of each county society shall satisfy the commissioners of his said county, that the annual report has been made to the State Society, as is required by law.

On motion,

Adjourned to meet January 19, at 9 o'clock A. M.

JANUARY 19, 1864.

The Executive Committee met at 9 o'clock A. M., pursuant to adjournment of yesterday.

Present—Messrs. Engle, Cornell, Holstein, Barto, Driesbach, Jackson, Kapp, Ellis, Colder, Peters, Ziegler, Hamilton, Haldeman and Knox, *President.*

The minutes of the last meeting were read and approved.

On motion of Mr. Hamilton, it was

Resolved, That the Secretary open correspondence with different county societies and localities, inviting proposals for the next State Fair, and make report thereon at the next quarterly meeting in March.

Mr. Kapp, on behalf of the Auditing Committee, reported that they had examined the account of the Treasurer as submitted and found the same correct.

The account, as submitted and audited, shows a balance due the society, and in the hands of the Treasurer, of $1,331 03, is as follows:

JOHN H. ZIEGLER, *Treasurer, in account with the Pennsylvania State Agricultural Society*, 1863.

DR.

To cash balance from late Treasurer	$1,113 19
To sale of memberships, single admission tickets, &c., during the Fair, September 29 to October 2	8,196 42
To life memberships for C. P. Parsons, E. C. Potts, Thomas H. Wentz, Martin Early, Geo. W. Parsons, Leroy Parsons, Dr. Wm. Wetherill, John S. Keller, Wm. H. Holstein, Henry S. Hitner, S. E. Hartranft, F. D. Sower, Geo. N. Corson, Carroll S. Tyson and David Schall	150 00
Cash for medals	100 00
State appropriation for 1863	2,000 00
	11,559 61

Note of the Luzerne County Agricultural Society for	$265 32
Lumber, &c., sold to A. B. Longaker, from Fair of 1863	300 00
Note of Conrad Bard & Son, upon which judgment has been obtained and in hands of James E. Gowen, attorney-at-law, for collection, note dated January 17, 1860, for	591 61

CR.

By the following payments, as per vouchers:

Printers' bills for advertising, &c., from 1 to 63	$961 25
Superintendents, clerk hire, gate-keepers, watchmen and police, from 1 to 15	1,217 50
Preparing grounds, carpenter work, lumber, water pipe and rent, from 1 to 5	2,056 40
Expenses of Executive and other committees, from 1 to 7	558 83
Labor, transportation, fodder, band, tents, &c., from 1 to 27	2,172 35
Stationery, coal, hardware, &c., from 1 to 17	433 53
Cash premiums awarded at Norristown	2,651 50

James Pollock, (mint,) for medals	$77 22
Mrs. Lescure, one year's rent	100 00
Balance in treasury	1,331 03
	11,559 61

On motion,

The matter of the breaking of the vase of Mrs. Delp, at the late fair, was referred to the Secretary for adjustment.

On motion,

The Treasurer was authorized to pay the printing bill of Mr. Spangler, in amount, $53.

On motion, it was

Ordered, That J. M. Tyson be allowed $10, as his expenses for hauling agricultural implements at the late fair.

On motion,

Adjourned *sine die.*

Agricultural Rooms,
Harrisburg, January 19, 1864.

The annual meeting of the society was convened, agreeably to public notice given, and the election opened.

On motion of President Knox,

D. H. Neiman, Esq., was called to the chair.

On motion,

Peter Hummel, Esq., was appointed judge of election, and Messrs. B. Morris Ellis and C. K. Engle as tellers. A. B. Longaker acted as secretary.

On motion of Dr. J. Brackenridge Clemens,

A committee from the Farmers' and Mechanics' Institute of Easton, Pa., was introduced, and stated that it was the desire of their society to secure the holding of the next State fair upon their grounds at Easton.

On motion,

O. L. Schreiber, W. H. Brunner and Joseph Whitman, a committee from the Lehigh County Agricultural Society, were introduced, and expressed the desire of having the next State fair held upon their grounds at Allentown.

On motion of Mr. Murdock,

The report of the Secretary was read, and further ordered that it be included in the 6th volume of the Transactions of the Society, about being published.

On motion of Mr. Cornell, it was

Resolved, That the Executive Committee have discretionary power to dispense with the holding of the June meeting.

On motion of Mr. Kapp,

The election was closed, and the President declared the following ticket elected:

PRESIDENT.

Thomas P. Knox, Norristown, Montgomery county	27 votes.

VICE PRESIDENTS.

1st district	William H. M'Crea, Philadelphia	27 do.
2d do	Frederick A. Shower, Philadelphia	27 do.
3d do	Chas. K. Engle, Bustleton, Philadelphia	27 do.
4th do	J. E. Mitchell, Philadelphia	27 do.
5th do	Adrian Cornell, Newtown, Bucks county	27 do.
6th do	Wm. H. Holstein, Bridgeport, Montgomery co.	27 do.
7th do	Isaac W. Van Leer, Wallace, Cester county	27 do.
8th do	Tobias Barto, Reading, Berks county	27 do.
9th do	C. B. Herr, Manor, Lancaster county	27 do.
10th do	John H. Cowden, Pinegrove, Schuylkill county,	27 do.
11th do	John B. Beck, Williamsport, Lycoming county	27 do.
12th do	Daniel G. Driesbach, Beach Haven, Luzerne co	27 do.
13th do	George D. Jackson, Dushore, Sullivan county	27 do.
14th do	Amos E. Kapp, Northumberland, Northumberland county	27 do.
15th do	Christian Eberly, Eberly's Mills, Cumberland co.,	27 do.
16th do	Daniel O. Gehr, Chambersburg, Franklin co	27 do.
17th do	Thaddeus Banks, Hollidaysburg, Blair county	27 do.
18th do	B. Morris Ellis, Muncy, Lycoming county	27 do.
19th do	James Miles, Girard, Erie county	27 do.
20th do	Michael C. Trout, Sharon, Mercer county	27 do.
21st do	John S. Goe, Brownsville, Fayette county	27 do.
22d do	John Murdoch, Jr., Pittsburg	27 do.
23d do	Moses Chess, Temperanceville, Allegheny co	27 do.
24th do	Joshua Wright, Finleyville, Washington county,	27 do.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

William Colder, Harrisburg	27 do.
Jacob R. Eby, Harrisburg	27 do.
B. G. Peters, Harrisburg	27 do.
James Young, Middletown, Dauphin county	27 do.

John H. Ziegler, Harrisburg	27 votes.
Frederick Watts, Ex-President, Carlisle, Cumberland county	27 do.
James Gowen, Ex-President, Mt. Airy, Philadelphia	27 do.
David Taggart, Ex-President, Northumberland	27 do.
Jacob S. Haldeman, Ex-President, New Market, York county	27 do.

CORRESPONDING SECRETARY.

A. Boyd Hamilton, Harrisburg	27 do.

CHEMIST AND GEOLOGIST.

Samuel S. Haldeman, Columbia, Lancaster county	27 do.

LIBRARIAN.

John Curwen, M. D., State Lunatic Hospital	27 do.

Honorable T. P. Knox, the newly elected President, then returned his thanks, in a few appropriate remarks, for the honor conferred.

On motion of John H. Ziegler, Esq., it was unanimously

Resolved, That the thanks of the Society are hereby tendered to A. B. Longaker, Esq., for valuable services rendered, and the report of the society's doings he has this day made.

On motion, adjourned.

JANUARY 19, 1864.

The newly elected Executive Committee met.

President Knox in the chair.

Present—Messrs. M'Crea, Engle, Cornell, Holstein, Barto, Driesbach, Jackson, Kapp, Ellis, Murdoch, Colder, Peters, Ziegler, Hamilton and Haldeman.

The minutes of the last meeting were read and approved.

Mr. Murdoch presented the resignation of Moses Chess, member elect from the Twenty-third district, stating that he was not a resident of said district, which, upon motion, was accepted, and William S. Bissell, of Allegheny, was elected to fill the vacancy.

On motion,

The Chair appointed Messrs. Engle, Hamilton, Ellis and Longaker a committee to revise and report upon a premium list.

On motion of Mr. Kapp,

The time of holding the next annual exhibition was fixed upon the 27th, 28th, 29th and 30th days of September next.

The following persons, each paying ten dollars to the Treasurer, became life members: Joseph Whitman, Centre Valley, Lehigh county; J. M.

Line, Allentown; O. L. Schreiber, Laubach, Northampton county; Tobias Barto, Reading, Berks county.

On motion, adjourned.

A. B. LONGAKER, *Recording Secretary.*

AGRICULTURAL ROOMS,
Harrisburg, March 15, 1864.

Second quarterly meeting of the Executive Committee convened at 10 o'clock A. M.

The President being absent, on motion of A. Boyd Hamilton, Mr. Wright. of Washington, was called to the chair.

Present—Messrs. M'Crea, Engle, Cornell, Cowden, Beck, Jackson, Kapp, Eberly, Ellis, Murdoch, Bissell, Wright, Colder, Eby, Ziegler, Hamilton, Haldeman and Longaker.

The minutes of the last meeting were read and approved.

Messrs. Ellis, Engle, Longaker and Hamilton, Committee on Premium List, made report, that they had not been able to complete the duty assigned them, nor can they do so until the location of the next fair is definitely determined.

On motion,

The report was received, the committee continued, and ordered to make report to the Committee of Arrangements to be hereafter appointed.

Mr. Ziegler, the Treasurer, submitted letter of James E. Gowen, Esq., relative to the collection of the claim against Conrad Bard & Son. The letter stated that judgment had been obtained, and at that time the collection of the debt was considered hopeless, but that further inquiry will be made and report thereon communicated to the society.

The Treasurer also submitted letter of Charles Dorrance, relative to the claim due from the Luzerne County Agricultural Society, stating that the matter will be laid before the society at its next meeting.

A committee consisting of J. M. Line, O. L. Schreiber and Joseph Whitman, Esqs., representing the Lehigh County Agricultural Society, were present, and submitted a proposal for the holding of the next State fair upon their grounds, at a rental of $700, subject to certain restrictions in use of grounds and buildings as per proposal filed.

A similar proposition of the Farmers' and Mechanics' Institute of Easton, Northampton county, was also received, making rental of grounds at $1,200, and tendering a donation of $650 by the citizens to the society in the event of said location being selected.

On motion of Mr. Murdoch,

The Chair appointed Messrs. Ziegler, Kapp, Cornell, Colder, Engle, Longaker and Knox, President, a committee to act upon said proposals, with full power to locate and contract with either of the said societies upon the best terms that can be obtained.

On motion,

Mr. Hamilton was added to the committee.

On motion of Mr. Ellis,

The committee proceeded to the election of a Recording Secretary and Treasurer for the ensuing year.

Mr. Murdock nominated for Secretary, A. B. Longaker.

Mr. Colder nominated Jacob Mish.

On motion,

The nominations closed, and A. B. Hamilton was appointed teller.

Messrs. M'Crea, Engle, Cornell, Cowden, Beck, Jackson, Kapp, Ellis, Murdoch, Bissell, Wright, Ziegler, Hamilton, Haldeman and Eberly—15, voted for Longaker.

Mr. Colder—1, voted for Mish.

On motion of Mr. Ziegler,

The election of Mr. Longaker was made unanimous.

For Treasurer, Mr. Colder nominated J. B. Rutherford.

Mr. Haldeman nominated George H. Bucher.

On a vote had,

Messrs. M'Crea, Jackson, Kapp, Eberly, Murdoch, Bissell, Wright, Colder, Ziegler and Longaker—10, voted for J. B. Rutherford.

Messrs. Engle, Cornell, Cowden, Beck, Ellis, Hamilton and Haldeman—7, voted for George H. Bucher.

On motion of Mr. Beck,

The election of Mr. Rutherford was made unanimous.

On motion of Mr. Murdoch,

The President, Secretary and Mr. Hamilton were authorized to appoint from members of the Executive Committee a sub-committee to take charge of the several different departments and supervise all reports, &c., in these departments during the holding of the next fair.

On motion of Mr. Hamilton,

The resolution of last meeting, relative to expenses of Executive Committee, was extended and applied to this meeting.

On motion of Mr. Ellis, and amended by Dr. M'Crea,

Messrs. Ellis, M'Crea and Murdoch were appointed a committee to advise with the Treasurer, and adopt such measures as they may deem expedient to secure the society against frauds in the selling and distribution of tickets at the next fair.

On motion of Mr. Hamilton, it was

Ordered, That the June quarterly meeting be dispensed with, and that a committee of arrangements be now appointed, with full power to provide for and make all the necessary arrangements for the holding of the next State fair, as well as to adopt a certificate for life membership, and procure a sufficient number of the same, and also to have power to appoint sub-committees.

The committee on location was appointed the committee of arrangements.

On motion of Mr. Engle,

Messrs. Hamilton, Kapp and Colder were appointed a committee to audit the accounts of the Treasurer, so as to enable him to pay over to his successor the balance due and deliver all papers, &c.

The Recording Secretary reported that he had received from Dr. M'Crea $10 for life membership, and paid the same over to the Treasurer.

On motion,

A vote of thanks was tendered Jacob Mish, Esq., for a lot of seeds procured from Department of Agriculture, and presented to Committee for distribution.

On motion,

The Committee adjourned to meet on Monday evening preceding the first day of the next State fair, at 7 o'clock.

A. B. LONGAKER,
Recording Secretary.

EASTON, PENN'A.

Third quarterly meeting of Pennsylvania State Agricultural Society.

The Committee met pursuant to adjournment.

President Knox in the chair.

The minutes of the last meeting read and approved.

Members present—Messrs. Knox, M'Crea, Engle, Mitchell, Cornell, Holstein, Van Leer, Barto, Cowden, Driesbach, Kapp, Eberly, Ellis, Trout, Goe, Murdoch, Bissel, Wright, Peters, Ziegler, Gowen, Hamilton and Rutherford.

On motion,

The Committee reviewed the awards of premiums.

On motion of Mr. Wright,

The report of the Committee on No. 13 was disallowed, inasmuch as the sheep entered in that class are improperly entered, and that the entries, as transferred by the Committee to No. 15, be approved, and their report therein be accepted.

On motion, it was

Ordered, That in Class No. 26 the report of the committee be set aside, and that Reese, Lake, Millick & Co., be awarded a premium of $15, or a diploma, for the best display of agricultural implements, as manufacturers;

and that a premium of $15, or a diploma, be awarded to F. W. Nobe, for the best display of agricultural implements.

On motion.

The resolution of January 20, 1864, was continued, and ordered to apply to this meeting.

On motion,

The following resolution of thanks from the Fruit Growers Society of Easton, Pennsylvania, was ordered to be entered upon the minutes:

"At a meeting of the Fruit Growers Society of Easton, Pennsylvnnia, held at Easton, September 29, 1864, it was

"*Resolved*, That the thanks of this society are due and hereby tendered to the officers of the Pennsylvania State Agricultural Society, for the excellent accommodations they have afforded us for our deliberations, and for the display of our fruits."

(Signed) WILLIAM HACKETT,
Secretary.

To A. B. LONGAKER,
Secretary Pennsylvania State Agricultural Society.

ROOMS OF THE SOCIETY,
HARRISBURG, *January* 16, 1865.

Fourth quarterly meeting of the Executive Committee—President Knox in the chair.

Members present—Messrs. M'Crea, Cornell, Holstein, Barto, Cowden, Beck, Driesbach, Gehr, Ellis, Wright, Colder, Eby, Peters, Ziegler, Haldeman, Hamilton and Longaker.

The minutes of the last meeting were read and approved.

On motion of Mr. Wright,

A committee of three, consisting of Messrs. Wright, Holstein and Hamilton, was appointed to audit and report upon the accounts of the Treasurer.

Mr. Hamilton, Corresponding Secretary, reported that the Commissioners of the Department of Agriculture had forwarded specimens of wheat, which came too late for distribution for last fall sowing, and that it was here at the disposal of such members as might desire it.

Mr. Hamilton also reported that he had received from the same Department some forty of the copies of the Agricultural Report for the year 1863, and that he had mailed one to each member of the Committee.

The President, Thomas P. Knox, laid before the Committee correspondence of C. F. Hogedam, Consul of Baden, which was ordered to be entered upon the minutes, and which is as follows:

CONSULATE OF BADEN,
PHILADELPHIA, *April* 8, 1864.

HONORABLE SIR:—Having received from the government of the Grand Duchy of Baden a statistical work, "*Die Gewerbe im Grotzherzogthum Baden; Ihne Statistic ihre Pflege, ihre Exengnisse,*" with instructions to deliver it to the Agricultural Society of Pennsylvania, I address your honor to inform me where I shall send it.

Very respectfully, your obedient servant,
C. F. HOGEDAM,
Consul for Baden.

The Hon. THOMAS P. KNOX, *Pres't Penn'a State Agr'l S., Harrisburg, Pa.*

To which the President, Mr. Knox, made the following reply:

SELMA FARM,
NORRISTOWN, *April* 12, 1864.

Hon. C. F. HOGEDAM, *Consul for Baden:*

DEAR SIR:—Your favor of April 8th, informing me of the kind notice your government has taken of the Pennsylvania State Agricultural Society, is at hand. Rest assured, dear sir, the kindness and courtesy manifested by your government, through you, their Consul, will be deeply felt and appreciated by the society I have the honor to represent; and I beg, in behalf of our Executive Committee, to tender to your government, through you, our heartfelt acknowledgment, not only for the high honor conferred, but also for the kind notice in placing in my hands, for the use of our society, so valuable an acquisition to its library.

Be pleased, dear sir, to tender to your government our grateful acknowledgments, and accept for yourself our highest regards and esteem for the manner in which you have carried out its wishes.

Respectfully,
Your friend and servant,
THOMAS P. KNOX,
President Pennsylvania State Agricultural Society.

P. S.—Our Annual Fair for the present year will be held at Easton, Pa., in September next, where your presence will give our society much pleasure, and nothing shall be wanting on the part of the Executive Committee to make your visit pleasant and agreeable.

CONSULATE OF BADEN,
PHILADELPHIA, *April* 13, 1864.

THOMAS P. KNOX,
President Pennsylvania State Agricultural Society,
Norristown, Montgomery County, Pa.:

DEAR SIR:—I have the honor to acknowledge the receipt of your courteous and polite note of yesterday, in answer to my letter of the 8th inst. It is as pleasing as it is gratifying to learn that you appreciate and fully understand the intention of the government of Baden in sending the alluded to work to your society. It is solely the wish to be better known, and, where practicable, to enter into a regular exchange with all similar institutions like yours, and to help, in so doing, to spread general information of universal usefulness, which makes it of course doubly gratifying when they fall in hands like yours.

I will not fail to communicate what you so generously express to the government of Baden, where, I am convinced, your sentiments will give much pleasure and satisfaction. I forward the book this day, by express, to your address and trust you will receive it.

If my health and circumstances will allow, I shall be much gratified to be present at your meeting in September next, and I assure you fully appreciate this indeed courteous kindness.

Believe me, dear sir,
With great esteem,
Your obedient servant,
C. F. HOGEDAM,
Consul for Baden.

On motion of Mr. Hamilton, it was

Ordered, That a full set of our transactions be forwarded to the Consul of Baden, for his government, as an acknowledgment of the valuable work presented to our society.

On motion of Mr. Holstein, it was unanimously

Resolved, That all the members of the Committee present sign, or authorize their names to be signed to the memorial to the Legislature, relative to the taxing of dogs.

Mr. Driesbach stated that the Luzerne County Agricultural Society proposed to pay $100, as full payment of a note of $262 31, held by our society against them.

Which proposition, on motion of Mr. Hamilton, was accepted.

On motion,

Adjourned to meet at 11 o'clock A. M., on Tuesday, 17th instant.

A. B. LONGAKER, *Secretary.*

AGRICULTURAL HALL, *January* 17, 1865.

Committee met pursuant to adjournment.

President Knox in the chair.

Members present—Messrs. M'Crea, Cornell, Holstein, Barto, Cowden, Beck, Driesbach, Ellis, Murdoch, Wright, Colder, Eby, Peters, Ziegler, Haldeman, Hamilton, Rutherford and Kapp.

The minutes of the last meeting were read and adopted.

On motion,

The time for holding the next exhibition was fixed for September 26, 27, 28 and 29.

Mr. Wright, chairman of committee to audit the account of the Treasurer, reported as follows:

JANUARY 16, 1865.

JOHN B. RUTHERFORD, *Treasurer, in account with the Pennsylvania State Agricultural Society.*

DR.

To cash received from John H. Ziegler, former Treasurer	$762 34
Exhibition at Easton	7,518 04
Life membership and medals	310 00
N. C. railway and 1 yearly membership,	13 00
State appropriation	2,000 00
	10,603 38

CR.

By cash paid for printing for exhibition at Easton, including many accounts of previous years; vouchers 1 to 74	$1,140 90
Rent of office at Harrisburg and stationery,	95 85
Water, carpentering and engine at Easton, 1 to 4	340 31
Police, labor and transportation, 1 to 10	623 28
Rent of grounds and tents, 1 to 3	1,103 00
Secretary's office, 1 to 48	527 41
Superintendents, clerks, gate-keepers, &c., at Easton, 1 to 30	1,294 49
Ornaments, paper, postage, music, telegraph, &c, 1 to 16	461 32
Expenses of Executive Committee one year, 1 to 12	745 39
Salaries, 1 to 3	600 00
Premiums paid at Easton	2,276 00
Cash paid for medals	80 00
Balance in the treasury	1,315 43
	10,603 38

A proposition of the Farmers' and Mechanics' Institute of Easton, relative to renting their grounds for next exhibition for $1,250, was received and laid before the society.

On motion of Mr. M'Crea,

The following resolution was adopted:

Resolved, That the actual expenses of the members of the Executive Committee, while attending upon their official duties, be paid by the Treasurer on presentation of their bills, so long as the funds of the society will admit of it.

On motion, adjourned.

A. B. LONGAKER, *Secretary*.

AGRICULTURAL HALL, *January* 17, 1865.

The society met pursuant to notice given, it being the time appointed for holding the annual election; when,

On motion of Mr. Ziegler,

Mr. Murdoch, Jr., was appointed judge of the election.

D. G. Driesbach and A. P. Lusk were appointed tellers.

The election was opened at two o'clock and closed at four o'clock P. M., and resulted as follows:

There being no opposition, each of the following officers received thirty-one votes:

PRESIDENT.

A. Boyd Hamilton.

VICE PRESIDENTS.

1st	District.	James A. M'Crea.
2d	do.	Craig Biddle.
3d	do.	V. L. Bradford.
4th	do.	James E. Mitchell.
5th	do.	Adrian Cornell.
6th	do.	William H. Holstein.
7th	do.	Isaac W. Van Leer.
8th	do.	Tobias Barto.
9th	do.	J. M. Dunlap.
10th	do.	John H. Cowden.
11th	do.	Joseph Sigman.
12th	do.	Daniel G. Driesbach.
13th	do.	John C. Morris.
14th	do.	Amos E. Kapp.
15th	do.	Geo. H. Bucher.
16th	do.	D. O. Gehr.
17th	do.	Louis W. Hall.

18th	District.	B. Morris Ellis.
19th	do.	Willard Russell.
20th	do.	Michael C. Trout.
21st	do.	John S. Goe.
22d	do.	John Murdoch, Jr.
23d	do.	William Bissell.
24th	do.	Joshua Wright.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

William Colder, J. R. Eby, B. G. Peters, John H. Ziegler, Peter Herdic, Fred'k Watts, Ex-President, James Gowen, Ex-President, David Taggart, Ex-President, J. S. Haldeman, Ex-President, Thomas P. Knox, Ex-President.

CORRESPONDING SECRETARY.

James Young.

CHEMIST AND GEOLOGIST.

S. S. Haldeman.

LIBRARIAN.

Henry Gilbert.

On motion, adjourned.

A. B. LONGAKER, *Secretary.*

JANUARY MEETING—*Continued.*

Special meeting of the Executive Committee.

A. Boyd Hamilton in the chair.

On motion,

John H. Ziegler was appointed Secretary *pro tem.*

On motion of Mr. Kapp,

A committee was appointed to advertise proposals for holding the next annual exhibition.

Messrs. Hamilton, Longaker, Rutherford, Kapp, Wright, Colder, Driesbach and Ziegler were appointed as the committee.

On motion, adjourned.

JOHN H. ZIEGLER, *Secretary pro tem.*

AGRICULTURAL HALL,
Harrisburg, *March* 21, 1865.

The first quarterly meeting of the Executive Committee.

President Hamilton in the chair.

Members present—Messrs. M'Crea, Cornell, Holstein, Sigman, Bucher, Murdoch, Bissell, Eby, Ziegler, Herdic, Knox and Longaker.

The minutes of the last meeting were read and approved.

President Hamilton reported that he had received a lot of tobacco and garden seeds, and presented the same to the members present for distribution.

The President laid before the society the letter of the Consul of Baden Baden, acknowledging the receipt of a full set of our transactions.

Proposals for the next State fair were received from the Farmers' and Mechanics' Institute of Easton, and from Peter Herdic, Esq., of Williamsport, asking the location at their respective places; which proposals, upon motion of Mr. Knox and seconded by Mr. M'Crea, as also all other proposals to be received, were referred to the committee on advertising for proposals; and said committee shall have full authority to locate the fair, and make all necessary arrangements for the holding of the same.

On motion,

The June quarterly meeting was dispensed with.

On motion of Mr. Murdoch, it was

Resolved, That President Hamilton, the Librarian and Secretary, shall have full authority to make exchanges and distribute such volumes of our transactions in such manner and to such persons as they may deem best.

On motion of Mr. M'Crea, seconded by Mr. Bissell,

J. B. Rutherford was chosen Treasurer for the next ensuing year, and A. B. Longaker Secretary.

The President laid before the society a letter from Mr. Goe, relative to the revision of the premium list, advising a large increase in the cattle and sheep classes, and decreasing those in classes of speed, which, upon discussion, met with general approval.

On motion of Mr. Ziegler, the following was adopted:

Resolved, That the paragraph of the resolution of January 18, 1864, in relation to the additional duties and the compensation therefore of the Corresponding Secretary, be and the same is hereby suspended, except as relates to the expenses of that officer as a member of the Executive Committee.

On motion of Mr. Murdoch, it was

Resolved, That the receipts hereafter from life membership be invested in State or United States securities by the Treasurer, and remain at interest until otherwise ordered.

On motion of Mr. Murdoch, it was

Resolved, That if any member or members of the Committee desire to attend the World's fair, at Dublin, they shall be furnished by the officers with a certificate accrediting them as representatives of this society.

Adjourned.

A. B. LONGAKER, *Secretary*.

STATE AGRICULTURAL SOCIETY,
FOURTH QUARTERLY MEETING,
WILLIAMSPORT, *Sept.* 28, 1865.

Members present—President Hamilton, Messrs. M'Crea, Cornell, Barto, Cowden, Sigman, Driesbach, Morris, Kapp, Bucher, Hall, Ellis, Russell, Trout, Murdoch, Jr., Bissell, Wright, Colder, Eby, Ziegler, Herdic, Taggart, Knox, Rutherford, Haldeman, S. S., Gilbert, Holstein and Longaker.

On motion,

The minutes of the last meeting were dispensed with.

On motion of Mr. M'Crea, it was

Ordered, That all money remaining in the hands of the Treasurer, unappropriated for expenses, except five hundred ($500) dollars, be funded at interest in such United States securities as may be deemed best by the President and Treasurer.

On motion of Mr. Ziegler, it was

Resolved, That the award of premium awarded to Mr. Herdic, of two hundred ($200) dollars, in Class No. 9, Division No. 2, be set aside for irregularity, and that the entrance fee of twenty ($20) dollars paid by Messrs. Frisch and Davis be refunded to them.

The Executive Committee resolved themselves into the Committee of the Whole, and reviewed the awards of premiums as reported by the judges.

On motion, it was

Resolved, That the resolution relating to the expenses of the members of the Executive Committee be applied to this meeting.

Mr. Murdoch, Jr., who had just returned from a visit to Dublin, Ireland, presented the society with the proceedings, premium lists, awards, &c., of the Dublin Exhibition for the year 1864.

On motion, adjourned.

A. B. LONGAKER, *Secretary*.

STATE FAIR, WILLIAMSPORT,
September 29, 1865.

The society met at 12½ o'clock, a very large number of the members of the Executive Committee being present.

The President announced the presence of Governor Curtin, and the orator of the day, Hon. Edgar Cowan, of Westmoreland county, and that Mr. Cowan would now deliver the annual address.

After the conclusion of the address, it was moved by Mr. Murdoch, Jr., and seconded by Mr. Driesbach,

That the President of this society request a copy of the address for publication.

Which, upon motion, was unanimously agreed to.

On motion of Mr. Knox, it was unanimously

Resolved, That the thanks of this society and audience be tendered the orator for his excellent address.

On motion, adjourned.

A. B. LONGAKER, *Secretary.*

Agricultural Rooms,
Harrisburg, *January* 15, 1866.

Fourth quarterly meeting of the Executive Committee.

Present—Messrs. Cornell, Holstein, Barto, Cowden, Sigman, Kapp, Bucher, Gehr, Hall, Ellis, Wright, Peters, Ziegler, Knox, Rutherford, Haldeman, Longaker, and Hamilton, President.

President Hamilton was called to the chair, and the last minutes read and approved.

The President reported that in accordance with the resolution of last meeting, the Treasurer had invested $5,000 in 7-30 U. S. bonds, by and with the advice of the President.

A communication was received from Mrs. Lescure, asking $200 rent for the next year, commencing May 1, 1866.

On motion,

The matter was referred to the President and Treasurer, to make such contract for rent as they may deem best.

The President laid before the Committee a letter from Mrs. Mary E. Gardner, of Williamsport, claiming $50 for a pair of young pigs, which she alleges were sent to the last fair and lost.

On motion,

The subject was referred to Ex-President T. P. Knox and Mr. Ellis, for settlement.

The President laid before the society a communication from C. F. Hagedorn, Bavarian Consul resident at Philadelphia, under date of November 28, 1865, transmitting to the society the annual report of the Royal Agricultural School at Weihenstephan, for years of 1864 and 1865.

On motion of Prof. S. S. Haldeman,

The Secretary was ordered to acknowledge the receipt of the same, and return the thanks of this society to the Royal Agricultural School, through the Consul, and as a further regard of our appreciation of the compliment, transmit to them a full set of our transactions.

A letter from Elijah Warne, of Easton, under date of December 11, 1865, was laid before the society, asking the award of a diploma for a burglar and alarm lock, which being considered of merit, on motion of Mr. Wright, was awarded a diploma.

The President also laid before the Committee a letter under date of January 6, 1866, from Hon. Isaac Newton, Commissioner of the Agricultural Bureau of the United States, relative to the use of the franking privilege, in distributing among our Committee the bi-monthly reports of that Bureau, in which he says "it would be impracticable, if not highly improper to send the reports subject to his blank frank."

After some discussion in relation to the contents of the letter, it was on motion,

Resolved, That it be laid upon the table.

On motion of Mr. Wright,

The President appointed Messrs. Wright and Holstein a committee to audit the accounts of the Treasurer.

A letter from H. W. Russell, Esq., relative to the location of the next fair at Erie, and also one of similar import from J. Lacey Darlington, Esq., of West Chester, asking the location of the next fair at that place, were laid before the Committee, and ordered to be filed.

On motion of Mr. Kapp, it was

Ordered, That a silver medal be awarded the Pleasant Valley Wine Company of Hammondsport, N. Y., in lieu of the money premiums awarded.

On motion,

The Committee adjourned to meet to-morrow, Tuesday, at 11 o'clock A. M.

A. B. LONGAKER, *Rec. Secretary.*

Annual statement of the Pennsylvania State Agricultural Society—John B. Rutherford, Treasurer.

DR.

1865.			
Jan.	17.	To balance in treasury	$1,315 43
"	30.	Cash for note of Luzerne Co. Agr'l Soc'y	100 00
Aug.	8.	From estate of Elliot Cresson	588 80

Sept.	29.	Proceeds of exhibition at Williamsport, from the sale of. single membership, tickets of admission, &c.	$10,452	00
"	"	202 life memberships, at $10 each	2,020	00
"	"	State appropriation	2,000	00
			16,476	24

CR.

Printing for 1865, vouchers, 1 to 88	$1,060	26
Hauling and transportation, 1 to 20	500	74
Preparing grounds, hay, engine, &c., 1 to 12	1,123	34
Labor and police, 1 to 15	1,164	85
Music and medals, 1 to 5	253	00
Stationery, tent and telegraphing, 1 to 14	674	48
Office expenses, clerk hire, &c., 1 to 14	967	36
Ticket sellers and gate-keepers	436	50
Secretary salary and expenses	398	85
Treasurer salary	150	00
Executive Committee expenses	350	40
Premiums paid at Williamsport	2,603	00
Rent of office at Harrisburg	125	00
7-30 U. S. bonds	4,988	60
Amount paid Agricultural College of Pennsylvania	588	80
	15,385	18
Balance in treasury	$1,091	06

Audited and found to be correct.

JOSHUA WRIGHT,
W. H. HOLSTEIN,
Committee.

JANUARY 16, 1866. Read, adopted and ordered to be filed.

A. B. LONGAKER, *Rec. Secretary.*

AGRICULTURAL ROOMS,
HARRISBURG, *January* 16, 1866.

The Executive Committee met pursuant to adjournment, at 11 o'clock A. M. President Hamilton in the chair.

The roll was called and following members answered to their names: Messrs. Cornell, Holstein, Barto, Cowden, Sigman, Kapp, Bucher, Gehr, Hall, Ellis, Murdoch, Colder, Eby, Ziegler, Knox, Trout and S. S. Haldeman.

Minutes of the last meeting were read and approved.

Messrs. Wright and Holstein, auditing committee, reported that they had examined the Treasurer's report and found it correct; which report was, on motion, approved and ordered to be filed.

The account as audited shows a balance in the treasury of $1,091 06 uninvested, and $4,988 60 invested in 7-30 U. S. bonds, of the par value of $5,000.

The committee to examine the claim of Miss Mary E. Gardner, reported that it appears from the inspection of the books of entry that the pigs were not entered thereon, and they therefore report adversely; which report, on motion, was adopted.

The President appointed Messrs. Murdoch and Nissley tellers to conduct the election to be held this day, between the hours of 2 and 4 P. M.

On motion of Col. T. P. Knox, seconded by Mr. Murdoch,

A diploma was awarded J. M'Minn, Esq., of Williamsport, for a display of fifty varieties of corn collected and preserved in the ears, and eight varieties of wheat preserved in bottles; and further, that Mr. M'Minn be requested to furnish the society with a statement of the time when, and how said collection was made, together with any matters of interest connected therewith, so that the same, when received, may be entered upon the minutes of the society.

On motion,

The resolution of last meeting, relative to expenses of the Executive Committee, was extended and applied to this meeting.

On motion, adjourned *sine die.*

A. B. LONGAKER, *Rec. Secretary.*

Agricultural Rooms,
Harrisburg, *January* 16, 1866.

The members of the State Agricultural Society met at 2 o'clock P. M., pursuant to notice. This being the time for the annual election,

On motion,

Ex-President J. S. Haldeman was called to the chair.

The tellers, Messrs. Murdoch and Nissley opened the election, and after holding the ballot open for two hours.

On motion,

The election was closed.

The tellers reported the following result:

PRESIDENT.

A. Boyd Hamilton, Harrisburg, Dauphin county.............	26 votes.

VICE PRESIDENTS.

1st	Con. dis.	James A. M'Crea, M. D., De Lancy Place, Philadelphia	26	votes.
2d	do.	George Blight, Germantown	26	do.
3d	do.	Vincent L. Bradford, Philadelphia	26	do.
4th	do.	A. B. Cummings, Philadelphia	26	do.
5th	do.	Adrian Cornell, Newtown, Bucks county	26	do.
6th	do.	William H. Holstein, Bridgeport, Montgomery county	26	do.
7th	do.	Isaac W. Van Leer, Wallace, Chester county	26	do.
8th	do.	Tobias Barto, Reading, Berks county	26	do.
9th	do.	Jacob E. Kreybill, Marietta, Lancaster county	26	do.
10th	do.	John H. Cowden, Pinegrove, Schuylkill county	26	do.
11th	do.	Joseph Sigman, Easton, Northampton county	26	do.
12th	do.	Daniel G. Driesbach, Beach Haven, Luzerne county	26	do.
13th	do.	John C. Morris, Friendsville, Susquehanna county	26	do.
14th	do.	Amos E. Kapp, Northumberland, Northumberland county	26	do.
15th	do.	George H. Bucher, Hoguestown, Cumberland county	26	do.
16th	do.	Daniel O. Gehr, Chambersburg, Franklin county	26	do.
17th	do.	Louis W. Hall, Altoona, Blair county	26	do.
18th	do.	B. Morris Ellis, Hughesville, Lycoming county	26	do.
19th	do.	N. Willard Russell, Belle Valley, Erie county	26	do.
20th	do.	Michael C. Trout, Sharon, Mercer county	26	do.
21st	do.	George Rhey, Millwood, Westmoreland county	26	do.
22d	do.	John Murdoch, Jr., Pittsburg, Allegheny county	26	do.
23d	do.	William Bissell, Pittsburg, Allegheny county	26	do.
24th	do.	Joshua Wright, Washington, Washington county	26	do.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

William Colder	Harrisburg	Dauphin county	26	votes.
Jacob R. Eby	do	do	26	do.
B. G. Peters	do	do	26	do.
Peter Herdic	Williamsport	Lycoming county	26	do.
John H. Ziegler	Harrisburg	Dauphin county	26	do.
Frederick Watts	Ex-President, Carlisle		26	do.
James Gowen	Ex-President, Mount Airy, Philadelphia		26	do.
David Taggart	Ex-President, Northumberland		26	do.
Jacob S. Haldeman	Ex-President, Harrisburg		26	do.
Thomas P. Knox	Ex-President, Norristown		26	do.

CORRESPONDING SECRETARY.

James Young, Middletown, Dauphin county.................. 26 votes.

CHEMIST AND GEOLOGIST.

Samuel S. Haldeman, Columbia, Lancaster county............ 26 votes.

LIBRARIAN.

Henry Gilbert, Harrisburg, Dauphin county.................. 26 votes.

The Recording Secretary, A. B. Longaker, made the annual report, which was ordered to be filed and published among the transactions of the society.

On motion of Mr. Ellis, it was

Resolved, That we memoralize the State Legislature to provide for and authorize the publication of our proceedings for the last two years, together with the reports of the several county societies, the transactions of the Fruit Growers Society, and the doings of the State Agricultural College; the printing and distribution of said reports to be under the control of the Legislature, and the matter for publication to be prepared by this society free of charge; and that the President, A. Boyd Hamilton, Esq., present this resolution to the Legislature, accompanied by such remarks as he may deem appropriate.

A general discussion was entered into upon the propriety of imposing a national tax upon dogs, as well as a State tax, as a source of revenue, and also for the protection of the wool-growers against the killing of sheep by dogs. During the discussion it was estimated that there are in this State 700,000 dogs.

On motion of Mr. Wright, it was

Resolved, That we hereby memoralize Congress, and request them to levy a tax upon dogs, not only to protect the wool-growers of the country against the killing of sheep by dogs, but also as a source of revenue, and that the President transmit to Congress this resolution, with such remarks as he may deem appropriate.

On motion,

The fourth section of the by-laws was so amended as to strike out "Tuesday," and insert "Wednesday," making it read:

"The society shall meet annually on the third Wednesday, at Harrisburg," &c.

On motion, adjourned.

A. B. LONGAKER, *Recording Secretary*.

HARRISBURG, PA., *January* 16, 1866.

After adjournment of the society, the newly elected Executive Committee met.

President A. B. Hamilton in the chair.

Members present—Messrs. Holstein, Barto, Sigman, Kapp, Bucher, Gehr, Ellis, Trout, Murdoch, Wright, Eby, Ziegler, J. S. Haldeman and Knox.

On motion of Mr. Holstein,

The 25th, 26th, 27th and 28th days of September next were fixed as the time of holding the next exhibition.

On motion,

A. Boyd Hamilton, President, J. B. Rutherford, A. B. Longaker, A. E. Kapp, William Bissell, J. H. Ziegler and D. G. Driesbach were appointed a committee to invite proposals for the location of the next fair, and to revise the Premium List and make report at the March meeting.

On motion,

Adjourned to meet the third Tuesday of March, at 7 o'clock P. M.

A. B. LONGAKER, *Secretary.*

HARRISBURG, *March* 21, 1866.

Second quarterly meeting of the Executive Committee.

President A. Boyd Hamilton in the chair.

Members present—Messrs. M'Crea, Blight, Cummings, Cornell, Holstein, Cowden, Sigman, Driesbach, Morris, Kapp, Ellis, Russell, Rhey, Murdoch, Bissell, Wright, Peters, Ziegler and Rutherford.

The President stated that he had a letter from Ex-President Gowen, expressing regret that the state of his health prevented his attendance.

The Secretary also, at the request of Ex-President Knox, tendered his regrets for absence on account of a severe cold and the inclemency of the weather.

The minutes for the several meetings held for the last quarter were read and approved.

On motion,

The Committee received nominations for Treasurer and Recording Secretary.

J. B. Rutherford being the only nominee for Treasurer, and A. B. Longaker the only nominee for Secretary, they were by acclamation unanimously elected to fill the respective offices for the next ensuing year.

A letter relative to the holding of the next State fair at Erie, Pa., was laid before the Committee, to wit:

ERIE, PA., *March* 7, 1866.

A. B. HAMILTON, Esq.:

DEAR SIR:—We have been appointed a committee by the Erie County Agricultural Society to confer with the officers of the Pennsylvania State

Agricultural Society for the holding of the fair of the State Society here the present year, and we submit this statement and proposal:

Our grounds contain twenty-eight (28) acres in one enclosure. There is a good half mile track on the grounds, (horsemen say the best in the State,) two buildings twenty-eight (28) by thirty (30) feet, upon wings about one hundred (100) feet apart, designed to put main building between; four buildings, put up for soldiers' barracks, which contain from ten to twelve thousand feet of lumber, which can be used for sheds, &c. There is an abundance of pure water on the grounds. The grounds are two and a half miles from Erie, on the Lake Shore railroad, and three-fourths of a mile from Philadelphia and Erie railroad track. The track of the Lake Shore railroad is on one side of the grounds and the main public road from Erie to Buffalo on the other. We are in negotiations now with the Lake Shore road to extend a side track to the grounds or to put in a switch.

Our hotel accommodations are: Brown's hotel and Morton house, first-class; American, Farmers', Mansion, National, Hamilton, Erie, City and Park, which would be called second class, and some half a dozen others.

We can, without doubt, procure one hundred life memberships, (and think a little effort will make it one hundred and fifty,) which we will endeavor to procure for the State Society.

We will provide for the committee sent here to prepare the grounds, if you conclude to hold the fair here.

Captain N. W. Russell proposes to attend the meeting of the society in Harrisburg the present month, when he will give you any additional information you may desire.

Trusting you will conclude to hold your coming fair here, we remain

Very respectfully yours,

(Signed) N. W. RUSSELL,
ROBERT EVANS,
JOHN A. TRACY,
WILSON KING,
M. B. BARR,
Committee Erie Co. Agricultural Society.

A proposition was also received from the Farmers' and Mechanics' Institute of Easton, Pa., asking for the next fair upon their grounds at Easton.

The place for holding the next fair was not determined upon, and the whole subject, together with the propositions from Erie and Easton, were referred to a committee, consisting of Messrs. Hamilton, Kapp, Bissell, Driesbach, Rutherford, Ziegler and Longaker, with full authority to select the place and make all the necessary arrangements in relation thereto.

The President, to whom had been referred the question of taxing dogs, stated that he had not fully prepared the memorial to Congress, but would do so at the earliest practicable period.

On motion,

The rent of the Agricultural room was fixed at the sum of $200 for the current year.

The President laid before the committee the report of the Montgomery County Agricultural Society, which was ordered to be filed among the papers of this society.

The following letter of L. D. Moore, M. D., Corresponding Secretary of the State Board of Agriculture, of Missouri, was laid before the Committee, which was ordered to be filed and engrossed upon the minutes:

MISSOURI BOARD OF AGRICULTURE,
OFFICE CORRESPONDING SECRETARY,
SAINT LOUIS, MO., *February* 27, 1866.

A. B. Hamilton:

SIR:—I have read in the papers that the rhinderpest is in your state.—Will your please inform me if it is true? to what extent, &c. If it is true, I feel disposed to go there to see what can be learned about it, in a few days, perhaps a week. I will have some of our first Agricultural Reports to send you.

I am, very respectfully yours,

L. D. MOORE, M. D.,
Cor. Sec. State Board of Agriculture.

In this connection, the following bill, the consideration of which was pending before the State Legislature, was laid before the Committee for their consideration:

"An Act to prevent the sale of diseased cattle in this Commonwealth."

A general discussion was then had in relation to the existence of the rhinderpest in certain portions of Montgomery and Chester counties, the supposed infected districts which had created so great an alarm as to become the object of the State legislation.

This discussion was participated in by Messrs. M'Crea, Ellis, Wright, Knox and Hamilton.

The following extract embraces the substance of that discussion:

"Several of the members present had made considerable investigation, and concurred that the disease was pleuro-pneumonia, and not a malady beyond the reach of careful management. It was also well authenticated that pleuro-pneumonia had existed in those localities with occasional fatality for the last four years, but that its severity is now less than formerly."

The Philadelphia Agricultural Society, having lately made an investigation of the distemper through well qualified veterinary surgeons, decided against the existence of any greater sickness among the animals of that section of our State than is usual. Several gentlemen of the State Society, who have made elaborate inquiry, take the same view of it. It was, therefore, concluded not to appoint a committee to make special investigation at present, but express the opinion of the committee as follows:

Resolved, That no information has been submitted to this society justifying the belief that any marked contagious disease exists among the cattle of this State. The strict observance of sanitary measures is recommended, and this society tenders to the committee of the Legislature any assistance it may be in their power to render in the further investigation of the subject.

The President was thereupon authorized to confer with the State authorities, county societies, or other parties, to lend the assistance of the State Society in making investigations, or to call a special meeting of the Executive Committee if any necessity arises for such a step.

The decision arrived at was that the disease, as at present developed, might be endemic but certainly was not contagious.

The Secretary was authorized to transmit the above resolution, and abstract to the Secretary of the Missouri State Board of Agriculture, as an answer to his letter of inquiry relative to the existence of rhinderpest in our State.

The Committee discussed the propriety of holding annually a fair in June, the object of which shall be the exhibition of farm implements, especially reapers and mowers, as well as the exhibition of stallions and brood mares.

Pending the discussion,

It was, upon motion,

Resolved, That the subject be referred to the Committe of Arrangements, with full power and authority, should they deem it expedient, to fix the time and place for holding such an exhibition, as well as to make all the necessary rules and regulations in relation thereto.

Mr. Bissell laid before the Committee a number of pamphlets in relation to the Paris Universal Exposition. President Hamilton also presented a number of a similar import, which had been forwarded to the society, by Mr. Seward, the Secretary of State.

President Hamilton laid before the Committee the following letter from Hon. Isaac Newton, stating that he had complied with the request of the commissioner:

DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C., *January* 26, 1866.

A. BOYD HAMILTON, Esq., *Harrisburg*, *Pa.:*

DEAR SIR:—Our library is deficient in the proceedings of your State society, the latest on hand being volume 4, for 1856. As I am desirous of having a complete set for preservation in the department, I shall feel obliged if you can and will supply the deficiency, or so much as in your power.

Very respectfully, yours,

ISAAC NEWTON, *Commissioner.*

The President laid before the Committee the following letter; which, upon motion, was ordered to be engrossed upon the minutes:

State Board of Agriculture
of the State of Minnesota,
St. Paul, *February* 5, 1866.

At a meeting of the State Board of Agriculture, held on the 5th inst., at the Capitol, in Saint Paul, the following preamble and resolutions were unanimously adopted:

Whereas, Feeling the great necessity and importance to the success of our republican institutions of a fostering care, by our general government, of the producing classes, and believing that our future greatness, strength and wealth as a nation must depend, in a great measure, on the general prosperity, intelligence and advancement of these classes; we therefore,

Resolve, That we have the fullest faith in the good results to accrue to these classes from a wise, competent and judicious management of the federal Department of Agriculture, and that while we recognize ability and wisdom at the head of the other departments of government, we can but deplore the inefficiency of that department, under the control of its present incumbent, Isaac Newton, whose incompetence is the subject of general complaint from the agricultural intelligence of the whole country.

Resolved, That in the opinion of this society, as representing the agricultural interests of Minnesota, our interests in the said Department of Agriculture imperatively demand a change in the administration of its affairs, and to this end we would earnestly entreat the President of the United States to appoint some competent and intelligent man as its head.

Resolved, That the Secretary of this society be instructed to transmit, without delay, a certified copy of these resolutions to the President of the United States, and to each of our Senators and Representatives in Congress, as expressive of our earnest desire for the welfare, success and beneficial results of the said Department of Agriculture.

(Copy of Records.) CHARLES H. CLARKE,
Secretary Minnesota State Board of Agriculture.

President Hamilton presented the following treatise by Prof. S. S. Haldeman, of Columbia, Pa., upon *Trichinæ spiralis*, which was ordered to be filed and published in the next volume of the transactions:

Considerable alarm has been excited throughout the country by a recently published account of the sickness and death of a young lady in one of our north-western cities, resulting from the use of pork diseased by minute worms infesting the muscles of the hog. Professor Haldeman, whose high literary and scientific attainments are well known to the public, has contributed the following interesting account of these worms to " *The Aye* :"

In the year 1603 Warenius published a treatise *de Lumbricis*, and in

1654 Greydanus issued another on the same subject, and both mention certain capillary worms between the skin and muscles, which sometimes enter the latter, causing suppuration. Their nature is doubtful, but they were, probably, not *Trichinæ.*

In February, 1833, Mr. Hilton, of Guy's hospital, London, recorded a disease of human muscles which he attributed to a species of entozoa, and two years later the English anatomist, Richard Owen, sent as a communication to the Zoological Society of London, a Description of a Microscopic Entozoon infesting the Muscles of the Human Body, upon which he founded his genus and species *Trichinæ spiralis*, (pronounced trick-ee-na spir-ah-lis.) The name is from the Greek, *thrix*, a hair, from a resemblance to a minute hair. Professor Owen describes it as a minute, transparent, thread-like worm, with the head tapering a little for about one-fifth the entire length, the remainder being of uniform thickness; both ends are obtuse, the size one-twenty-fifth of an inch in diameter, and one-seven hundredth of an inch in diameter, wound in coils of two or two and a half turns. Each worm is wholly contained in a liquid, enclosed in a cyst or capsular cavity, much as the yolk of an egg is contained in the glair, aud this in the shell, and in fact, the cysts have gritty mineral particles, which, by turning the edge of the dissecting knife, led to their discovery. In rare cases two or three *Trichinæ* have been detected in a single cyst.

The structure of this worm (at least in this condition) is much simpler than that of the *Gordius*, or hair worm found in puddles, and believed by school-boys and poets to be horse hairs which have turned into living worms. The *Trichinæ* exhibited signs of life after the muscles had commenced to decay, and had been left three days in alcohol to arrest putrefaction. Experiments are wanted to show the time required to kill them in salt, but their vitality in hams which have been cured in the ordinary mode is extremely doubtful. Other entozoa have been found alive when taken from herrings which had been frozen, and Professor Owens mentions "a large and lively round worm," which was released in carving a piece of boiled confish at table.

Although of microscopic size, the *Trichinæ* are so abundant in the muscles they infest that they cause debility in the sufferer, and may result fatally.

In newspaper articles it has been recommended to export American pork to Europe, overlooking the fact that trichinised pork was first detected in America by the distinguished anatomist Professor Joseph Leidy, who announced the fact in the proceedings of the Academy of Natural Sciences, October, 1846, page 108. He states that he found *Trichinæ spiralis* in the "extensor muscles of the thigh of the hog." "The Entozoon he supposed to be the *Trichinæ spiralis*, heretofore considered as peculiar to the human species. He could perceive no distinction between it and the specimens of *Trichinæ spiralis* which he had met with in several human subjects in the dissecting room."

As this worm was found in the hog, Diesing in his *Systema Helminthorum*, 1851, vol. 2, p. 114, supposed it might be different from that of man, and called it *T. affinis*—but which Kuchenmeister (in his work on human parasites, Leipzig, 1855) thinks Leidy was corrected in considering the same as *Trichinæ spiralis.*

Thorough boiling or frying will destroy all entozoa by the coagulation of the albumen, but it requires three or four hours to boil a ham, and a roast of beef may have the outside charred and the inside raw, with the blood uncoagulated.

Besides *Trichinæ*, the hog gives us the tapeworm in the roundabout way in which many worms are now known to be produced. The tapeworm in man produces millions of minute eggs, some of which fall in the way of the omnivorous hog, either with food or drink. The eggs develop into minute creatures, which make their way through the system and lodge in the cellular tissue of the muscles, where they do not become tapeworms, but what was formerly supposed to be a distinct species of worm, which was named *Cysticercus cellulosæ*, better known as the so-called measles in pork. Measly pork being swallowed as human food, the *Cysticercus* becomes a tapeworm (*Tænia solium*) somewhat in the manner that a larva becomes an insect.

Tapeworms are almost unknown where pork is not in use, as among Jews and Mahommedans. Where it is used much caution is necessary, because cysticerci have been found in water in which sausages have been washed, and upon knives with which measly pork had been cut. When traveling in European localities where tapeworms are common, and where gardens are cultivated with night-soil, I have abstained from salads and similar raw vegetables.

S. S. HALDEMAN.

COLUMBIA, PA., *February* 24, 1866.

On motion, it was

Resolved, That the resolution relative to the expenses of the Executive Committee, as heretofore passed, be extended and applied to the members attending this meeting.

On motion, it was

Resolved, That the calling together of the members of the Executive Committee for the June meeting, shall be discretionary with the President.

On motion, adjourned.

A. B. LONGAKER, *Secretary.*

EASTON, PA., *September* 26, 1866.

Fourth quarterly meeting of the Executive Committee.

President Hamilton in the chair.

The following members were present—Messrs Blight, Cummings, Cornell, Holstein, Barto, Kreybill, Sigman, Driesbach, Morris, Kapp, Bucher, Gehr, Ellis, Russell, Trout, Rhey, Bissell, Colder, Eby, Peters, Ziegler, Taggert, Knox, Rutherford, S. S. Haldeman and Gilbert.

On motion of Mr. Holstein, it was

Resolved, That the President and Treasurer be and are hereby authorized to sell such an amount of the United States bonds, now held by the society, as shall be sufficient to defray the necessary expenses of the fair—should the receipts be found insufficient for that purpose.

On motion of Ex-President Knox, it was

Resolved, That hereafter no premiums shall be offered or awarded to reaping, mowing and sewing machines or musical instruments, but that the judges shall only make such complimentary notice of the several machines on exhibition as they may think their superior excellence or advantages may decide.

The Committee reviewed the awards of the judges, making such modifications in the several reports as will be found noted in the said reports.

On motion, adjourned.

A. B. LONGAKER, *Secretary*.

AGRICULTURAL HALL,
HARRISBURG, *January* 15, 1867.

Quarterly meeting of the Executive Committee.

President Hamilton in the chair.

The following members present—Messrs. M'Crea, Cummings, Cornell, Holstein, Kreybill, Sigman, Driesbach, Kapp, Bucher, Gehr, Ellis, Rhey, Murdock, Bissell, Eby, Ziegler, Ex-President Haldeman, Knox, Rutherford and S. S. Haldeman.

The minutes of the last meeting were read and adopted.

President Hamilton stated that he had presented the memorial of the society to the last Legislature, relative to the printing of the 7th volume of transactions of the society, &c., and referred the Committee to the report of the Committee on Printing, as set forth in the House Journal of 1866, which is as follows:

Mr. Mann, from the Committee on Printing, to whom was referred the memorial of the State Agricultural Society, praying that the 7th volume of their transactions may be printed by the Legislature, made the following report, viz:

That an examination of the 6th volume of the transactions of the said society, shows that three years' proceedings were included in said volume, and that a large amount of uninteresting matter is contained in it. Leaving out this useless matter, there is not sufficient left to make in it two years' proceedings, since the sixth volume was published, a book of sufficient size to correspond with other volumes. For this reason and for the additional reason that your committee think the printing expenses of the State ought to be curtailed, we are of the opinion that the 7th volume ought not to be published, until it can contain at least another year's proceedings of the society, and that when printed, it ought to be done under the supervision of a committee of the Legislature, and that the uninteresting details of premiums ought to be left out.

President Hamilton laid before the Committee a letter from Commissioner Newton, stating that he had sent under his blank frank, copies of the annual report in the Department of Agriculture for the year 1866.

The President also laid before the Committee the Treasurer's annual report, which upon motion, was referred to Messrs. Rhey and Holstein to audit, and report the same to the Committee.

Mr. M'Crea announced the death of John H. Cowden, a member of the Executive Committee, as follows:

The Executive Committee of this society, since its organization, has been called upon twice to deplore the loss of colleagues. It now receives additional evidence that no occupation or calling is free from "death's solemn summons." It has to lament the decease of John W. Cowden, the representative of this society from the Tenth district, a resident of Pinegrove, Schuylkill county, one of its most attentive and useful members, who recently departed this life at Northumberland, the place of his birth—the scene of his earliest joys and recollections, amid the care of kind friends and at peace with all. In consideration of his loss, we

Resolve, That in the demise of Mr. Cowden the Pennsylvania State Agcultural Society, and its Executive Committee, mourn the absence of an efficient officer and colleague, and a useful citizen and urbane gentleman.

Resolved, That the deceased, by his efforts in behalf of the interests of the society, had won the respect of all his associates, and his numerous excellencies will cause them long to gratefully cherish his memory.

Resolved, That a copy of these proceedings, properly authenticated by the officers of the society, be transmitted to the family of the deceased.

Resolved, That A. E. Kapp and D. G. Driesbach, Esqrs., be appointed a committee to present these proceedings to the family of the deceased.

On motion of S. S. Haldeman, the awards in Class No. 40 were revised and modified.

The President laid before the Committee the following article, at the request of J. T. Wright, editor of the *National Agriculturalist*, viz:

STATE TRIAL OF IMPLEMENTS.

"Trials of agricultural implements have been held under the auspices of the State Agricultural Societies of New York, Ohio, Indiana and Illinois, and been attended with the most gratifying results. The State of New York, last winter, appropriated to her State Society five thousand ($5,000) dollars for this purpose. The trial took place at Auburn, in the month of July, 1866, and brought together the largest crowd of spectators and interested farmers ever held in the United States.

"Trials in other States have also been very successful. This is the only method that the merits of field and barn machines can be ascertained. Premiums at fairs without trial, is a mere farce.

"The only correct method is by fair and varied trial on all kinds of ground and in every variety of grain and grass. This requires days instead of hours, and is not practical at fairs. We have heretofore called the attention of our Pennsylvania State Society to this subject, and hope they will, at an early day, take such steps as will insure an elaborate trial for the harvest of 1867. We have no doubt the Legislature will make the necessary appropriation."

Laid on the table.

Mr. Bissell, Chairman of Committee No. 42, on awards at the late Easton fair, asked instructions relative to the testing of phosphates exhibited in that class. The plan proposed was that the phosphates should be procured from some agent of the respective exhibitors, nearest the locality at which the same was to be tested, and that the test should be made at such points as the committee may direct. In no case should the manufacturer be apprised of the selection to be made from his agents, until after the fertilizer had been obtained.

On motion of Professor S. S. Haldeman,

The Secretary was ordered to obtain a silver medal to be presented to Dr. Edward Swift, of Easton, Pa., for his large and valuable collection of minerals and geological specimens, and display of American antiquities, exhibited at the late fair.

Upon the suggestions of President Hamilton, a complimentary life membership was presented to General A. L. Russel, for his valuable and efficient services as Chief Marshal during the fairs of 1865 and 1866.

On motion of Mr. Holstein,

A silver medal was awarded Miss Eliza J. Haldeman, of Columbia, Pa., in commutation of cash premiums, awarded in Class No. 40. The premiums awarded were in amount twenty-eight ($28) dollars, and given for best drawings, designs and paintings in oil.

Mr. Rhey called the attention of the Committee to the propriety of recommending some amendment to the general road laws, permitting owners of land to make their roads through their own premises, and be credited the amount in taxes to be thereafter assessed; which subject, upon motion, was referred to a committee of Messrs. Rhey, Gehr and Cummings, to make report thereon to the next meeting of the Committee.

On motion,

The Committee adjourned to meet at nine o'clock A. M., the 16th inst.

AGRICULTURAL HALL, *January* 16, 1867.

Adjourned meeting of the Committee. President Hamilton in the chair. The following members present—Messrs. M'Crea, Cummings, Cornell, Holstein, Kreybill, Sigman, Dreisbach, Kapp, Bucher, Gehr, Ellis, Rhey, Murdoch, Jr., Bissell, Ziegler, J. S. Haldeman, Knox, S. S. Haldeman.

A quorum of the members being present, the minutes of the last meeting were read and approved.

Mr. Rhey, chairman of the committee to whom was referred the subject of amending the road laws of the Commonwealth, made the following report:

The condition of the public roads of Pennsylvania is generally admitted to be very bad. It is, undoubtedly, owing to the system of repairing them. To change the system at once would not be popular, and yet a very large proportion of the public desire any change which would result in good roads. The act submitted herewith, which is proposed as a supplement to existing road laws, simply gives to any person who may choose to do so, the privilege of repairing roads through his own lands without changing existing laws, without interfering with existing usages and prejudices, and without subjecting the townships to any debt. To the extent to which work would be done in pursuance of this amendment would unquestionably benefit the public. In view of these considerations, we recommend the immediate adoption of the annexed act as a supplement to the existing laws.

(Signed) G. RHEY,
D. O. GEHR,
A. B. CUMMINGS.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That the supervisor of roads in any township in this Commonwealth is hereby authorized and required to contract with the owner or occupier of any land through or by which any public road is located, to open or repair the same whenever said owner or occupier so desires.

SECTION 2. Said contract shall be in writing, one copy of which shall be filed with the township auditors and another with the clerk of the court of the county in which the parties reside, and when the work in pursuance of said contract is done in accordance with the conditions of the same, the supervisor shall issue to said owner or occupier a certificate, setting forth the value of the work done, which shall be received in payment of taxes for road purposes assessed upon the lands of said owner or occupant in that township, and shall be paid in no other way. Said supervisor and his successor are hereby required to enter on the back of said certificate the amount of taxes for each year assessed as aforesaid, until the said certificate shall be fully liquidated, and also report to the auditors, annually, the amonnt so allowed.

On motion of Mr. Ellis,

The above report was adopted.

Pending the adoption of the report, a spirited debate was engaged in upon the propriety of the proposed legislation, Messrs. Rhey, Ellis and Murdoch favoring the report, and Messrs. J. S. Haldeman, Bucher and Longaker against it.

The objections were that the bill is impracticable in many districts of the State, and that the State Agricultural Society should not involve its members in questions of local legislation.

On motion,

The President appointed Messrs. Rhey, Gehr and Cummings a committee to present the action and proceedings of this Committee to the Legislature.

John B. Rutherford, Treasurer, in account with the Pennsylvania State Agricultural Society.

DR.

1866.			
Jan.	16.	To balance in treasury this day	$1,091 06
"	"	Cash from E. Warne, one entry fee	1 00
"	"	Cash from L. W. Hall, two yearly memberships	2 00
"	"	Cash from James Young, life membership	10 00
"	"	Six months' interest on 7-30 bonds	182 50
Mar.	21.	George Rhey, life membership	10 00
April	7.	Estate of Elliott Cresson, dec'd	50 00
July	17.	Six months' interest 7-30 bonds	182 50
Oct.	1.	State appropriation	2,000 00
"	"	Life memberships of Robert Dempster, Frederick Seitz, Jeremiah Roth, David Lerch, Reuben Helleck, D. H. Neiman, W. V. Higgins, T. S. Boyd, William Young, Tinsley Jeter and James Elder	110 00
		Proceeds of Easton exhibition, for single admission tickets, memberships, &c., Sept. 25, 26, 27, 28, 1866	8,689 69

Oct.	1.	Proceeds of sale of 7-30 bond, $500	$539 10
1867.		Donation from George W. Childs	29 25
Jan.	15.	Six months' interest on 7-30 bonds	164 25
			13,061 35

CR.

Rent of office, Harrisburg, vouchers, 1 to 4	$175 00
Rent of ground at Easton	753 00
Sup't of grounds, decorations, clerks, &c., vouchers, 1 to 107	764 96
Labor and police, 1 to 3	710 38
Forage for stock, 1 to 2	198 59
Music, tents, telegraphing, meals, &c., 1 to 9	782 22
Preparing grounds, lumber, &c., 1 to 20	1,272 16
Hauling and transportation, 1 to 8	1,447 17
Printing for 1866, 1 to 106	1,339 52
Expense of Executive Committee, 1 to 17	878 53
Expense President's office, clerks, tents, &c., 1 to 8	310 55
Expense Secretary's office, clerks, stationery, &c., 1 to 14	771 18
Expense Treasurer's office, gate-keepers, ticket sellers, &c., 1 to 8,	682 85
Secretary's salary	300 00
Treasurer's salary	150 00
Cash paid Agricultural College from estate of Elliot Cresson, deceased	50 00
Premiums for 1866	3,286 00
Medals	78 09
Premiums paid for 1865, since settlement	75 00
Balance in treasury	36 15
	13,061 35

ANNUAL MEETING OF THE SOCIETY,
January 16, 1867.

Pursuant to notice, the members of the Pennsylvania State Agricultural Society met at 10 o'clock, A. M., this day.

This being the time fixed by law for the annual election, and there appearing a quorum of members present,

President A. B. Hamilton was called to the chair, and A. B. Longaker appointed Secretary.

On motion,

The Chair appointed William S. Bissell judge, and D. G. Driesbach and Joseph Sigman tellers of the election.

The minutes of the last annual meeting were read and approved.

While the election was being held the society proceeded to transact its usual business.

On motion of Col. Knox,

A committee consisting of Messrs. Cornell and Longaker were appointed to solicit from the New York State Society a number of reports upon the trial of machinery, &c., at Auburn, in July last, sufficient to serve each member of the Executive Committee therewith.

On motion of Col. Knox, it was

Resolved, That a memorial from this society be presented to the Legislature, asking an appropriation of $6,000 to defray the expense of a trial of reapers and mowers, and such other farm implements as it may be practicable to test during the present coming harvest, at such time and place as may be agreed upon by a committee of arrangement to be hereafter appointed.

On motion, it was

Resolved, That the Secretary address the several county societies and request them to unite in a memorial relative to the above trial.

On motion of Ex-President Haldeman,

The President appointed Adrian Cornell, of Newtown, Bucks county, O. L. Schreiber, of Lehigh county, Joseph P. Connor, of Fowlersville, Columbia county, John E. Parke, of Allegheny city, Jacob S. Haldeman, Harrisburg, Col. T. P. Knox, of Norristown, and J. E. Kreybill, of Marietta, Lancaster county, a committee to fix the time and place of trial, with full power and authority to make all the necessary arrangements in relation thereto, in the event the Legislature shall make the requisite appropriation for the defraying the expenses of the said trial.

On motion, it was

Resolved, That we memorialize the Legislature to pass a general law prohibiting side shows and mountebanks within the distance of five miles from the place of holding any agricultural exhibition, without the consent of the society first had and obtained thereto.

The hour of twelve o'clock M. having arrived,

The election was declared closed.

The tellers proceeded to count the votes, and reported the result of the election as follows:

PRESIDENT.

A. Boyd Hamilton.. 35 votes.

VICE PRESIDENTS.

1st District—	James A. M'Crea	35 votes.
2d....do....	George Blight	35 do.
3d.. .do....	Vincent L. Bradford	35 do.
4th...do....	A. B. Cummings	35 do.
5th...do....	Adrian Cornell	35 do.
6th...do....	William H. Holstein	35 do.
7th...do....	Samuel J. Sharpless	35 do.
8th...do....	Tobias Barto	35 do.
9th...do....	Jacob E. Kreybill	35 do.
10th...do....	George B. Brown	35 do.
11th...do....	Joseph Sigman	35 do.
12th...do....	Daniel G. Driesbach	35 do.
13th...do....	John C. Morris	35 do.
14th...do....	Amos E. Kapp	35 do.
15th...do....	George H. Bucher	35 do.
16th...do....	Daniel O. Gehr	35 do.
17th...do....	Louis W. Hall	35 do.
18th...do....	B. Morris Ellis	35 do.
19th...do....	H. W. Russell	35 do.
20th...do....	Michael C. Trout	35 do.
21st...do....	George Rhey	35 do.
22d ...do....	John Murdoch, Jr	35 do.
23d ...do....	William S. Bissell	35 do.
24th...do....	Joshua Wright	35 do.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

William Colder	35 votes.
Jacob R. Eby	35 do.
B. G. Peters	19 do.
John H. Ziegler	35 do.
John Way, Jr	35 do.

CORRESPONDING SECRETARY.

James Young	34 votes.

CHEMIST AND GEOLOGIST.

S. S. Haldeman	35 votes.

LIBRARIAN.

Henry Gilbert	35 votes.

George Bergner received 16 votes for additional member of Executive Committee.

We certify the above returns to be correct. *January* 16, 1867.

WILLIAM S. BISSELL, *Judge.*
DANIEL G. DRIESBACH, } *Tellers.*
JOSEPH SIGMAN, }

On motion,

The society adjourned *sine die.*

A. B. LONGAKER, *Recording Secretary.*

AGRICULTURAL ROOMS,
HARRISBURG, *January* 16, 1867.

Immediately after the adjournment of the society the newly elected Executive Committee met.

President Hamilton in the chair.

There being a quorum of members present, the Committee proceeded to the transaction of business.

Upon motion of Ex-President Haldeman, it was

Resolved, That hereafter all mountebank shows be excluded from the fair grounds.

On motion of Colonel Knox, it was

Resolved, That the President and Secretary be and they are hereby authorized to present, by memorial to the Legislature, the several questions upon which legislation is desired, and communicate therewith the action of the society and Executive Committee.

On motion of Mr. Holstein, it was

Resolved, That the days for holding the next annual fair shall be September 24, 25, 26 and 27 of the present year; and the President and Secretary are hereby authorized to invite proposals from such localities as may or shall desire its location, to be submitted to the Committee at the March quarterly meeting.

On motion of Colonel Knox,

The thanks of the society were tendered to Dr. J. B. Dunlap, for samples of Chilian wheat, presented for distribution, which wheat was collected by Dr. Dunlap during a recent visit to South America.

Mr. J. S. Haldeman moved that this Committee do request the President of the United States to remove Isaac Newton, the Commissioner of Agriculture, upon the ground of incompetency to discharge the duties of the position.

Which motion was postponed for the present.

On motion,

The resolution relative to the expenses of the members of the Executive Committee was extended and applied to this meeting.

On motion,

It was agreed that we do now adjourn to meet on the third Wednesday of March next, at two and a-half o'clock.

A. B. LONGAKER, *Recording Secretary.*

Agricultural Rooms,
Wednesday, March 20, 1867.

The Committee met this afternoon at 2½ o'clock, agreeably to the adjournment in January. The attendance was unusually large.

Present—Messrs. Hamilton, President, Dauphin; M'Crea, Philadelphia; Blight, Germantown; Cummings, Philadelphia; Cornell, Bucks; Barto, Berks; Holstein, Montgomery; Kreybill, Lancaster; Sigman, Northampton; Dreisbach, Luzerne; Morris, Susquehanna; Kapp, Northumberland; Bucher, Cumberland; Colder, Dauphin; Peters, Dauphin; Knox, Montgomery; Ziegler, Dauphin; Ellis, Lycoming; Eby, Dauphin; Rhey, Westmoreland; Murdoch, Allegheny; Haldeman, Dauphin; Wright, Washington; Rutherford, Treasurer, Longaker, Secretary.

Propositions for holding the next exhibition on the 24th of September, were received from Philadelphia, Pittsburg and East Pennsylvania Society at Norristown. The advantages of the various localities were considered, and finally referred to a committee with power to decide, consisting of Messrs. Hamilton, Kapp, of Northumberland, and Way, of Allegheny.

Mr. Kreybill reported that he had made inquiry upon the subject of the proposed appropriation by the Legislature for the trial of implemeuts during the present season, and was satisfied that none would be made, principally for the reason that the Legislature was urged to consider the propriety of making large additions to the number, and liberal appropriations to charitable institutions. The committee was thereupon discharged.

The premium list was revised and enlarged. A resolution submitted upon the subject of the agricultural statistics of the State was passed, and ordered to be laid before the Legislature.

Mr. Rhey, of Westmoreland, submitted and had passed the following upon an important subject in agricultural economy:

Resolved by the Pennsylvania State Agricultural Society, That the Legislature of the State be requested to appropriate a sum sufficient to defray the expenses of Prof. S. S. Haldeman, chemist and geologist of this society, and of a competent assistant, to be selected by him, in ascertaining the best method of rendering the night soil and sewerage of the State available in enriching exhausted or other lands, and make report not later than the next session of the Legislature; provided the cost shall not exceed one thousand dollars.

A committee of arrangements of five was ordered to be appointed, as soon as a location for holding the exhibition was determined upon, and the President appointed one of the number.

After all the current business of the society and committee was disposed of, including the re-election of A. B. Longaber, of Montgomery county, as Secretary, and John B. Rutherford, of Dauphin, as Treasurer, the Committee adjourned to meet again at the place of holding the next State fair, in September.

AGRICULTURAL ROOMS,
HARRISBURG, *May* 6, 1867.

The Committee on Proposals for holding the fair of 1867, met this day, and after inquiring and examining into the propositions of the several competing localities, decided upon Pittsburg as the most eligible place.

A. B. HAMILTON, *President.*

STATE AGRICULTURAL ROOMS,
PITTSBURG, *September* 26, 1867.

The third quarterly meeting of the Executive Committee was held at their rooms, No. 10, St. Clair street.

President Hamilton in the chair.

The roll was called, and all the members answered to their names.

On motion,

The minutes of the last quarterly meeting were dispensed with.

The President, Mr. Hamilton, Chairman of Committee on Location of Fair for 1867, stated that the understanding with the Allegheny County Agricultural Society was, that the grounds should be rent free to the State Society, and the local subscription, which was about $3,000, should inure to the county society, in lieu of compensation, the same to be collected by the last named, though no agreement has been entered into in writing to that effect.

The President further stated that the Committee of Arrangements had encountered a great deal of trouble in arranging for a supply of water; that it was deemed absolutely necessary to obtain water from the main basin of the city, so that the supply would be certain and sufficient beyond a doubt. To accomplish this, it was found necessary to lay about five thousand feet of pipe. The great objection first encountered was the price, the amount estimated to be necessary being varied from $2,000 to $3,000. After much inquiry and considerable delay, Messrs. Davis & Phillips submitted a proposal, to give the use of the pipe and lay the same, at a cost of eighteen cents per foot, for two inch, and fourteen cents for one inch dimensions. Under this contract, the prospect was that the cost of the water would be something over $1,000.

It was also found necessary to erect additional buildings. Those erected were a building about 40 feet×40, uniting the two wings in a form of a cross, an amphitheatre at the track, sheep and swine pens, &c. The track also required much grading, and the grounds levelling and cleaning up. All these things were done under contract.

On motion, it was

Resolved, That the President shall have full authority to make such settlement with the Allegheny County Agricultural Society as he may deem best.

The Executive Committee then proceeded to examine the awards of the Judges on premiums, and revised the same as appears noted on the several reports in the entry books.

On motion,

The President, Treasurer and Secretary were authorized to review entry book No. 46, (non-enumerated articles,) and that where the award of a Diploma is made for articles that are not deemed meritorious, it shall be changed into a money premium, not exceeding $3, in lieu of the premium awarded. It was further

Resolved, That this resolution shall apply to all other classes, with full power to make all necessary revisions.

On motion, it was

Resolved, That the resolution as formerly passed, relative to the expenses of the Executive Committee, shall be applied to this meeting, and that the chairmen of the judges coming from a distance, shall be embraced in this resolution.

On motion, it was

Resolved, That the President and the Treasurer shall have authority to use the funded money of the society, in such manner as is provided for in a former resolution.

On motion, adjourned.

A. B. LONGAKER, *Recording Secretary.*

STATE AGRICULTURAL ROOMS,
HARRISBURG, *January* 14, 1868.

The fourth quarterly meeting of the Executive Committee was held at 3 o'clock P. M.

A. Boyd Hamilton, President, in the chair.

Members present—Messrs. Ellis, Sigman, Brown, Murdoch, Gilbert, Holstein, Eby, Ziegler, Hamilton. The Secretary being absent,

On motion,

John H. Ziegler was elected Secretary *pro tem.*

On motion of Mr. Gilbert,

The Committee adjourned until Wednesday morning, at 10 o'clock.

State Agricultural Rooms,
Harrisburg, *January* 15, 1868.

The State Agricultural Society met pursuant to notice.

President Hamilton was called to the chair, and John H. Ziegler elected Secretary *pro tem.*

Members present—Messrs. Ellis, Brown, Murdoch, Sigman, Rutherford, Nissley, Gilbert, DeHaven, Hoffman, Hæhnlen, Linn, Eby, Hamilton, Sproat, Russell, Parsons and Ziegler.

After some remarks made by the President, Mr. Brown offered the following, which was agreed to:

Whereas, The Executive Committee has been unable to close the business of the society, for the term for which it was chosen, and it is desirable that this should be done before a new election is had; therefore, be it

Resolved, That an auditing committee be appointed, to examine the account of the Treasurer, and make report to the annual meeting and election of the society, to be held on Wednesday next, January 22, 1868, between the hours of 1 and 3 o'clock P. M., of said day, which annual meeting is hereby adjourned until that day.

The President appointed Messrs. Gilbert and Ellis to audit the account of the Treasurer.

On motion, adjourned.

State Agricultural Rooms,
Harrisburg, *January* 21, 1868.

Meeting of the Executive Committee.

President Hamilton in the chair.

On motion,

The reading of the minutes of the last meeting was dispensed with.

The roll was called and twenty-three members answered to their names.

The President laid before the Committee bills for printing, as follows: *Pittsburg Republic* and *Harrisburg Telegraph*; when

On motion, it was

Resolved, That the bill of the *Pittsburg Republic* be reduced to the sum of $111, and that the Daily and Weekly *Telegraph* be reduced $11 50; and that the Treasurer is hereby authorized to pay said amounts.

On motion of Mr. Knox, it was

Resolved, That a committee be appointed to confer with the Senate and House Committees on Agriculture of the State Legislature, for the purpose of urging the claims of this society for an appropriation for various purposes.

The Chair announced the following committee: Messrs. Cornell, Knox, Wright, Rhey, Peters, M'Crea, Holstein, Bucher, Sigman, Cummings, Kapp and Barto.

A communication was subsequently received from the Senate and House Committee on Agriculture, appointing to-morrow morning, at ten o'clock, as a time to hear the committee from this society.

Whereupon,

On motion of Colonel Knox, it was

Resolved, That the thanks of the Committee be and they are hereby tendered to the Committees of the Senate and House of Representatives, for their kind and prompt action in affording the committee a hearing.

Mr. Cornell submitted an interesting paper on the cattle disease; which,

Upon motion of Dr. M'Crea,

Was laid on the table.

On motion, it was

Resolved, That the committee to confer with the committees of the Legislature be and are hereby instructed to urge upon them the necessity and propriety of passing a general law against cattle running at large.

On motion,

A resolution relating to public roads, submitted by Mr. Rhey at the last yearly meeting, was referred to a special committee, consisting of Messrs. Cummings, Rhey and Rutherford.

On motion,

The Committee adjourned to meet to-morrow morning at ten o'clock.

A. B. LONGAKER, *Recording Secretary.*

State Agricultural Rooms,
January 22, 1868.

The Executive Committee met pursuant to adjournment of yesterday.

President Hamilton in the chair.

Present—Messrs. M'Crea, Blight, Cummings, Holstein, Barto, Sharpless, Kreybill, Sigman, Morris, Kapp, Bucher, Ellis, Rhey, Wright, Ziegler and Knox.

The minutes of the last meeting were read and approved.

The President laid before the Committee the letter of William Snyder, asking for a change of the award upon his farm gate as reported at the last fair.

When on motion, it was

Ordered, That the award of the judges be sustained.

The President made a statement in relation to the report of a special committee on the sheep rack of Daniel Close, entered in Class 46, informing the society that it was expressly stipulated with Mr. Close that no examination and report should be made on his rack, unless his competitors should also come before the special committee, or have an opportunity of so doing. The committee, however, subsequently made report without the examination of the competing racks, and that in consequence thereof the President had suppressed the publication of the special report; whereupon,

On motion of Mr. Bucher,

The action of the President was sustained.

The letter of James Young, Jr. & Co., relative to the award on swine, was read and referred to the President and Secretary for adjustment in such manner as they may deem expedient.

A communication from Cyrus Elder, Secretary of the Industrial League of Pennsylvania, asking for certain statistics, was referred to the Secretary with instructions to send reply.

The Committee on Essays reported progress and were continued, with power to report at the next meeting.

The President reported that Agricultural Reports had been forwarded to this society by the State Boards of Agriculture of Ohio and Michigan; whereupon, on motion of Mr. Cornell, it was

Resolved, That the thanks of this society are hereby tendered to John H. Klippart, Esq., Secretary of the Ohio State Board of Agriculture, and Sanford Howard, Esq., Secretary of the Michigan State Board of Agriculture, for copies of the reports of both boards, forwarded to this society, and that a copy of this resolution be sent to the above Boards of Agriculture.

The above resolution was extended to include the New York, Indiana Iowa and State Boards, for copies of their reports.

Mr. Cornell, on behalf of the committee to attend the trials of implements at Utica, N. Y., September, 1867, made a very elaborate and interesting report, which was ordered to be filed and published with the transactions of the society.

The report of Mr. Cornell was also accompanied by an offer of the New York State Agricultural Society, tendering assistance and the use of their tests in the event the State Agricultural Society of Pennsylvania shall make a similar test or trial of implements, which offer, upon motion, was accepted and thanks returned for the courtesy.

The report was read as follows:

REPORT OF THE COMMITTEE ON THE TRIAL OF IMPLEMENTS BEFORE THE NEW YORK STATE SOCIETY, 1867.

To the Hon. A. Boyd Hamilton,
President of the Pennsylvania State Agricultural Society:

We, the undersigned, a committee appointed to visit an exhibition of a trial of implements, under the direction of the New York State Agricultural Society, held at Utica, September 11, 1867, submit the following report:

The display of plows on the grounds was not as large as had been expected from the previous entries for the spring trial. Many of those then entered were not brought out the second time for competition and trial.

The display in the other departments, except in the amount of entries made, was of rather novel character. The articles appeared to be well adapted to the work for which they were designed.

The grounds selected for the trial were the farms of Mr. Butterfield, near Utica, and were well adapted to the purpose of putting the implements to a severe test. The sward land had not been plowed for a number of years, and was quite compact, rather dry and full of small pebbles or cobble stones, while the stubble land was more mellow and covered by a heavy growth of grass and weeds, thus affording a good opportunity to test the quality of the plow for turning under such a heavy growth of vegetable matter for manure.

It is not our design to go into a detail of all the implements thus exhibited and tested, but to note the general character of those exhibited in each class.

In consequence of not having the dynamometer test to refer to, this report will have to be based wholly from observation, and therefore will not be of such practical value as we desired for the interest of the society.

The plow, the pioneer of all other implements of husbandry, was exhibited in a variety of forms, from the gang plow to the level land and side hill plow.

The cast-iron plows were mostly from the firm of Mr. Nourse & Co., and represented by the Hon. Ex-Governor Holbrook. They presented a variety of sizes, from the mellow land plow to the double Michigan sod and sub-soil plow, and the deep tiller. They were all of the convex mould to a greater or less extent. In a portion of them the construction of the moulds was such so as to press quite heavily on the turned furrow, in order to pulverize the soil in the same operation with turning it, but we fear this extra work was done at too great a sacrifice of power, both to team and plowman.

The work done by most of these plows was of a fair quality, but we did not consider it superior to that done by many other cast-iron plows, either as regards the draught to the team or the labor of the plowman.

The deep tiller or double Michigan sod and sub-soil plow was well adapted to the purpose it was designated, being capable of cutting the upper furrow slice to the depth of from four to six inches and turning it down in the bottom of the furrow, and raising up the sub-soil to the depth of ten to twelve inches and placing it well on the top of the furrow in a well pulverized condition.

This plow required four good horses to accomplish the work. The draught by the dynamic test was found to be a fraction less per square foot of earth raised in favor of deep plowing, or in other words, it required more than half the power to turn a furrow six inches deep and twelve inches wide than it did to turn one twelve inches deep and twelve inches wide; the amount of draught being eighty pounds to the cubic foot.

The steel plows were exhibited by F. F. Smith, the Messrs. Remington and Wm. Whiteley.

The first named is made of cast steel by Collins & Co., Hartford, Conn., and was tested by the society and done satisfactory work in both soil and stubble land; but from observation, it appeared to require more power than should be required with a steel plow to accomplish the same amount of work. The Valley Clipper, exhibited by the Messrs. Remington, of Ilion, New York, did not compete for a premium and was not tested by the society. It was shown in both the green sward and stubble land, doing good work and had many friends. It appeared to take from fifteen to twenty per cent. less power to draw it than the Collins plow.

The steel plow exhibited by William Whiteley, of Springfield, Ohio, was the greatest favorite on the ground. It was claimed for this plow that its peculiar construction would enable it to do the greatest amount of work with the least possible amount of power. In consequence of some misunderstanding between the exhibitor and the committee, it was not tested by the committee, but was shown for two days, greatly to the satisfaction of the hundreds of visitors who saw it in operation.

In the stubble land, with two horses, it turned a furrow nine inches deep and thirteen inches wide, pulverizing the soil in the most perfect manner, and covering well the great growth of grass through which, in many places, it had to pass.

The draught of this plow appears to be full 33 per cent. less than that required of some others to accomplish the same amount of work, and then doing the work with much greater ease to the plowman.

The steel plows were all of the concave form of mould. The great difference in the draught was in the curve and angle of the mould to the furrow slice; some having the curve perfectly true so as to turn the furrow with the least power, while others were more abrupt and made a heavy pressure on the furrow after it should have been perfectly clear of the plow.

Of the side hill and level land plows, we had three different varieties. The first tested was exhibited by Ex-Gov. Holbrook. It was a plow of large size, the mould board being three feet six inches long, with cast point and share. The mould was convex, varying from one to one and a-half front, to four inches at the back part of the mould. This plow was tested by the society. It was designed to turn a furrow six inches deep and twelve inches wide, but the quality of the work did not meet our views as being first-class, and the draught appeared to be unnecessarily heavy.

No. 2 was exhibited by C. W. Syker, of Suffield, Connecticut, made of cast iron, moulds from point to point three feet, capable of turning a furrow fifteen inches wide by six inches deep. The position of the moulds was so abrupt against the furrow, that it did not do as perfect work as could be desired, and also at too great a sacrifice of labor for man and team. The great novelty of this plow was in its construction, in having two moulds, points and shares; the one turning the furrow to the right, the other to the left, and being so made and adjusted that the one not in use was placed in a position above the beam, in order to be out of the way, thus affording a perfect mould board to turn the furrow in either direction. The moulds of the plow on trial were to abrupt, and pressed too hard against the furrow to secure ease of draft to the team or light work to the plowman. The principle of having two perfect moulds made of steel, and consequently light, so as to give you a perfect right and left hand plow, thus enabling the husbandman to plow the level land as well as side hill without ridges or dead furrows, is well worthy the attention of the manufacturer and farmer. It is generally admitted by the best agriculturists in this State, that level cultivation is preferable to high ridges and deep furrows. The greatest objection we see to the principle, is the weight of the second mould, point and share.

No. 3 was the Chenango Valley Clipper, exhibited by Wm. D. Burch, of Sherburn, Chenango county, New York. This was a small, compact, light and durable side hill and level land plow, weighing ninety pounds, and made of cast iron. The mould was slightly convex, capable of doing good work, turning a furrow from five to six inches deep and from eleven to twelve inches wide, and pulverized the furrow well. The advantages claimed for this plow is its great strength, durability, cheapness of repairs, ease of draught and guidance of the plow. The cost of the parts liable to wear out are small; the mould, and point and share combined weigh some twenty pounds, and are the only parts liable to wear out for years. This plow we considered the best adapted to side hill work of any plow at the trial, and it done good work on level land. The fixtures on the beam, so as to change the position of the draught from right to left, so that the draught is always in line with the furrow in plowing steep hill sides, (where it is difficult to use two horses,) is rather a novel method of changing the line of draught, and probably could be attached to level land plows to advantage, in order to keep them steady and to guide them.

A sub-soil attachment to a common plow, was exhibited by R. J. Wheatly, of DuQuoin, Perry county, Illinois. This attachment was made of steel, in the shape of the letter U, so constructed as to be attached to any ordinary plow, and to run at any depth, from one to eight inches in the bottom of the furrow, thus serving to mellow up the sub-soil to that depth, without turning the clay up to the surface, to the injury of the surface soil. The inventor claims that by the use of this attachment, you can get some fifteen inches of mellow soil, at the one operation, without turning up the clay among the surface soil. This attachment has met with much favor in parts of the west, and probably could be used to advantage, on much of the clay sub-soils in Pennsylvania.

The display of corn plows and gang plows comprised several varieties. The first to which our attention was called, was the Phifer plow, manufactured by A. S. Breavly & Co., of Trenton, New Jersey, designed to dry corn or root crops, either as a plow or cultivator, passing astride of the row, finishing up both sides at one operation; it could also be used as a cultivator in preparing lands for any kind of crops, or as a gang plow with seed sower attached, to sow grain and plow it in at the same operation; it was awarded the first premium.

M'Quiston's improved cultivator and gang plow was also exhibited, but as it is so well known in Pennsylvania, it is not worth while to go into the detail of this implement. We had others from the State of New York, well worthy of the attention of farmers, all claiming to be the best ever invented, but as those implements were not tested in our presence, we can say but little of their respective value to the farmer.

Alldon's horse thill hoe was shown in six different forms, but on trial it did not come up to our views of a first class implement, in any of its various forms.

A cultivator and hilling plow, exhibited by L. R. Right, of Troy, New York, is worthy of notice. It was made to expand and contract, to suit the different width of rows of corn or root crops, so as to cultivate them in the early stages of growth; and by removing three of the teeth, a plow made to expand and contract, is substituted in their stead, which serves to push the mellow earth up to the rows of roots or corn, without the rolling motion given it by the common plow, so that the danger of covering up the plants is greatly obviated by its use. It was the best adapted to the wants of the gardener, trucker and farmer, of any implement of the kind on exhibition.

A harrow was exhibited by Mr. Randle, of Adams, Jefferson county, New York, with a sulkey attachment, by which a child, or invalid, could ride upon a spring seat to do the work of a strong man. In our estimation, it would add full one-third to the draught, and as that was the only new feature about the harrow, we do not recommend it to the farmers of Pennsylvania, as we think, in most cases, it would be far preferable for the driver to walk, and make it that much easier for the team.

John Morgan, of Deerfield, New York, exhibited his patent combined harrow, field cultivator and potato digger. As a harrow it took the first premium, and is the most perfect of the class of double harrows that has come to our notice; in fact it is the only harrow hinged in the middle, in the form of the old Scotch harrow, that will do its work evenly on all kinds of uneven surfaces. As a harrow, we saw it tested to our entire satisfaction, and we do not hesitate to recommend it as a harrow; but not seeing it tested as a field cultivator or potato digger, we cannot say anything of its value for those purposes.

Long's combined seeder, cultivator and roller was exhibited by Peter Low, of Cherry Valley, Otsego county, New York. This implement is designed to take the place of the grain drill and the broad-cast sowing machine, but we did not see it in operation. It appeared to have many good points of construction, and may, with a little further improvement, supersede the grain drill and broad-cast sower for the purpose of seeding grain, as the whole of the work is finished up at one operation.

Machines designed to plant corn, beans, potatoes, &c., were on exhibition, and many other implements which we considered of but little value to the farmer, on account of the imperfection of the quality of the work. It would be useless to go into the detail of all those in this report.

In making out this report we were obliged to depend upon our own judgment entirely of the merits of many implements, without an opportunity to see them tested as fully as was desired, and we may, therefore, have committed some errors in our opinion of their value. From the number of implements to be examined, and owing to the shortness of the time which we could devote to the examination of the different machines, and not having a full opportunity to see them all fairly tested, we may have erred in our judgment. In announcing thus our conclusions, we hope the managers of the exhibition will not think such errors, if any there be, intentional, as it is our desire to make out this report so as to do justice to the exhibitors, as well as to the Pennsylvania State Agricultural Society, whose representatives we were on that interesting occasion.

The question may be asked whether the advantages and gains of these trials are sufficient to compensate for the trouble and expense of them. We remark, that a beginning has been made in the right direction, in order to find out the true construction of the plow and other implements of husbandry. When we look back one hundred and fifty years, to the implements then in use for the cultivation of the soil, we find them to be of the most imperfect character; and until the nineteenth century, the improvements were slow. For the last thirty years it has been far more rapid than at any other period of the world, and we have reason to believe it will be still greater in the next thirty years than it has been in the past.

Some of the important principles to be discovered in the construction of plows may be stated as follows:

First. The true construction of the mould board—whether it should be concave or convex, and the inclination of the angle to the furrow, to do the best work with the least power.

Second. To find the proper width of share to do the best work with the least power, whether it takes less power to cut the entire furrow loose or whether a part should be broken, and if so, what proportion should be cut and what proportion should be broken.

Third. To ascertain whether there is any difference in the draught of the plough, in consequence of a variation of the land-side cut, when cut under, straight or over, as all are claimed to have their particular advantages.

Fourth. To find the difference in the draught of the same plow with the lock coulter, the spur cutter, and the open cutter, in order to discover which requires the least power to do the same work.

Fifth. What kind of metal is the best adapted for the construction of mould boards of the lightest draught, whether cast iron, cast steel, or rolled steel, and whether of hard or soft metal.

The above comprises the most prominent points now to be tested in the common plows. After this is well understood, we can go further and ascertain whether a single plow or a gang of plows on wheels will take less power than the ordinary plows. The best way to ascertain these facts is to encourage these trials, thus bringing together the machines of various construction, and continue to apply all the proper tests until these points are decided. As this is a great and expensive undertaking, we cannot expect to accomplish so great a result by individual enterprise, nor by the Agricultural Society alone, but we must seek the aid of legislative appropriation to carry out this important work. It is also worthy of a trial to test the digging machine, the cultivation of the land by steam power, ditching machine, plows for making mole drain, and all other implements connected with the cultivation of the soil, as well as all other implements of husbandry, in use in gathering and preparing the produce of the soil for market. To accomplish this, will require money to defray the expenses of the trial, and as the Pennsylvania State Agricultural Society has not the funds to spare for that purpose, let this society ask an appropriation of the Legislature of Pennsylvania of a sum sufficient to defray the necessary expenses of a trial of all kinds of agricultural implements, to be held under the directions of the Pennsylvania State Agricultural Society, at such times and place as may be selected by the society for that purpose.

In conclusion, permit us to return our sincere thanks to the officers and committee of trial of implements at Utica, under the direction of the New York State Agricultural Society, for their kind reception of the delegates of this society, and for their assistance in giving us all the information of the many tests during the trial; and also for the very liberal offer of their assistance, together with the use of all the implements prepared for their trial, free of charge, in the event we should have a similar trial in this State. The offer is a most liberal one, and we hope this society and the Legislature of Pennsylvania will see the great importance of holding such a trial for the great Commonwealth of Pennsylvania.

All of which we respectfully submit to the Pennsylvania State Agricultural Society.

ADRIAN CORNELL, *Bucks county.*
N. W. RUSSELL, *Erie county.*

Laid on the table.

Messrs. Gilbert and Ellis, a committee to audit the accounts of the Treasurer, made report, as follows:

JOHN B. RUTHERFORD, *Treasurer of Pennsylvania State Agricultural Society, for the current year of* 1867.

DR.

To balance in treasury, January 16, 1867	$36 15
Cash from Joseph Sigman, lumber	70 50
Nineteen life memberships, at $10	190 00
Cash from George Rhey	9 50
Sale of seven-thirty bonds of $500	520 00
Six months' interest on bonds	146 00
Proceeds of exhibition at Pittsburg	15,723 43
State appropriation	2,000 00
Sale of seven-thirty bond, $1,000	1,071 60
Do. seven-thirty bond, $500	537 00
Do. seven-thirty bond, $500	536 00
	20,840 43

U. S. bonds, five-twenties	$2,000 00
Pittsburg note	1,200 00

CR.

Rent of office at Harrisburg, vouchers, 1 to 4	$200 00
Printing, 1 to 75	2,506 05
Executive Committee, 1 to 17	875 18
Secretary's office, clerks, &c, 1 to 19	1,273 45
Treasurer's office, ticket sellers, gate-keepers, &c., 1 to 7	719 23
Premiums at Pittsburg	2,373 00
Medals	95 35
Superintendence at Pittsburg	735 73
Entertainment of committees, &c	1,275 00
Preparation of grounds and decorations, 1 to 12	2,648 83
Water, 1	1,330 00
Lumber and carpentry, 1 to 2	3,871 94
Police	736 50
Transportation, labor, &c., 1 to 15	1,377 24
Secretary's salary	300 00
Treasurer's "	150 00
Balance in treasury	372 93
	20,840 43

Which report was, on motion, accepted, and ordered to be transcribed with the minutes.

On motion,

The President, Mr. Hamilton, appointed Messrs. Ellis and Blight, judges of the annual election to be held this afternoon.

On motion of Mr. Knox,

The thanks of the Committee were voted to Mr. Cornell, for his very able and interesting report upon the trial of implements at Utica, New York.

On motion,

The time of meeting of the Executive Committee, for the January quarterly meeting, was fixed for the Tuesday preceding the third Wednesday of January, in each year hereafter.

On motion, adjourned.

A. B. LONGAKER, *Recording Secretary.*

STATE AGRICULTURAL ROOMS,
Harrisburg, *January* 22, 1868.

The members of the Pennsylvania State Agricultural Society met at one o'clock P. M., for the purpose of holding the annual election.

Messrs. George Blight and B. Morris Ellis acted as tellers of the election.

The election was held during the usual hours, when it was, upon motion, declared closed.

The officers reported that the persons hereinafter named were duly elected; each having received 26 votes, being all the votes cast.

PRESIDENT.

A. Boyd Hamilton	26 votes.

VICE PRESIDENTS.

1st District	James M'Crea	26 votes.
2d...do	A. B. Cummings	26 do.
3d...do	Samuel M. Felton	26 do.
4th...do	George Blight	26 do.
5th...do	Adrain Cornell	26 do.
6th...do	William H. Holstein	26 do.
7th...do	Samuel J. Sharpless	26 do.
8th...do	Tobias Barto	26 do.
9th...do	Jacob E. Kreybill	26 do.
10th...do	George B. Brown	26 do.
11th...do	Joseph Sigman	26 do.
12th...do	Daniel G. Driesbach	26 do.
13th...do	John C. Morris	26 do.
14th...do	Amos E. Kapp	26 do.
15th...do	George H. Bucher	26 do.
16th...do	Daniel O. Gehr	26 do.
17th...do	John I. Thompson	26 do.
18th...do	B. Morris Ellis	26 do.
19th...do	H. W. Russell	26 do.
20th...do	Michael C. Trout	26 do.
21st...do	George Rhey	26 do.
22d...do	John Murdoch, Jr	26 do.
23d...do	William S. Bissell	26 do.
24th...do	Joshua Wright	26 do.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

William Colder	26 votes.
Jacob R. Eby	26 do.
Benj. J. Peters	26 do.
John H. Ziegler	26 do.
John Way, Jr.	26 do.
Frederick Watts	26 do.
James Gowen	26 do.
David Taggart	26 do.
Jacob S. Haldeman	26 do.
Thos. P. Knox	26 do.

CORRESPONDING SECRETARY.

Lyman D. Gilbert	26 votes.

CHEMIST AND GEOLOGIST.

S. S. Haldeman	26 votes.

LIBRARIAN.

Lucius Rogers	26 votes.

On motion, adjourned.

HARRISBURG, *January* 22, 1868—3 *o'clock P. M.*

The newly elected Executive Committee met. President Hamilton in the chair.

Newly elected members present—Messrs. M'Crea, Cummings, Blight, Cornell, Holstein, Sharpless, Barto, Sigman, Driesbach, Kapp, Bucher, Ellis, Rhey, Murdoch, Wright, Eby and Knox.

The President laid before the Committee a letter of George W. Brown, relative to the location of the next fair at Pottsville; one of similar import from Judge Marvin, in behalf of Erie; one of similar import of W. S. Bissell, in behalf of Allegheny city; one of similar import from Messrs. Jennings, Chess and Verner, in behalf of the Allegheny Agricultural Society. Information was also given, that the East Pennsylvania Agricultural Society, at Norristown, and the Harrisburg Park Association, would submit propositions of a similar import.

On motion,

The President and Secretary were instructed to invite and receive proposals from the several localities desiring the next fair, to be submitted to the Committee at the March quarterly meeting.

On motion of Mr. Bucher,

The 29th and 30th days of September, and the 1st and 2d days of October, were fixed as the time of holding the next annual fair.

On motion,

The President was authorized to permit R. A. Lamberton, Esq., to have the use of the society's room, at such rent as he shall deem proper, until the house of Mr. Lamberton can be repaired, he having recently suffered a loss from fire.

A committee representing the Schuylkill County Agricultural Society, was introduced, who made statements in favor of locating the next fair on their grounds.

On motion of Mr. Cornell, it was

Resolved, That the thanks of the Pennsylvania State Agricultural Society are hereby expressed to the committee on the trial of implements at

Utica, N. Y., held under the sanction of the New York State Agricultural Society, for their liberal offer of assistance and the proffered use of their instruments, in the event a similar trial should be had in this State, under the auspices of this society.

On motion, it was

Resolved, That the Executive Committee meet on the 18th day of March next, at nine o'clock A. M.

Mr. Knox, on behalf of the committee appointed to confer with the Senate and House Committees on Agriculture, reported:

That they had met those committees, and laid all matters fully before them in relation to an appropriation for the trial of implements; that they were courteously received, and awarded a very patient and interesting hearing, and that the committee seemed favorably impressed with the great importance of such a trial.

Your committee also submitted the propriety and necessity of the printing of the transactions of the society, together with the doings of the Farm High School, the several Fruit Growers' Societies, and the Wool Growers' Associations of the State.

The committee, upon motion, were discharged.

On motion, adjourned.

A. B. LONGAKER, *Secretary.*

HARRISBURG, *March* 18, 1868.

Quarterly meeting of the Executive Committee.

President Hamilton in the chair.

The following members present—Messrs. M'Crea, Blight, Cummings, Cornell, Holstein, Brown, Sigman, Gehr, Rhey, Murdoch, Jr., Eby, Peters, Ziegler, Knox, Gilbert, Longaker, Rutherford and Rogers.

The minutes of the last meeting were read and approved.

The President laid before the Committee for distribution, a quantity of garden seeds, which had been received from the Department of Agriculture, at Washington, D. C.

The President also stated that the resolution of the Legislature to print transactions had passed both branches, with House amendment, which was non-concurred in by the Senate, upon which non-concurrence a committee was appointed and made report, but upon a vote in the House on the report of the conference committee, it was lost by an indefinite postponement.

That the resolution to appropriate $4,000 for the trial of implements had been reported favorably by the Senate committee, but no move towards its passage had yet been made.

A circular from the Fruit Growers Society of Pennsylvania, relative to nomenclature, was received and ordered to be transcribed with the minutes. It is as follows:

POMOLOGICAL FORMULA OF DESCRIPTION,

ADOPTED BY THE

PENNSYLVANIA FRUIT GROWERS SOCIETY, FEBRUARY 15, 1865.

In obtaining the characteristics of new fruits, it is advisable to form a comparison with the same organs belonging to the older well-defined varieties.

DIVISION FIRST—Origin and History.

This being an important auxiliary in determining the relative value of fruits, a correct and reliable record of each variety should be traced out, and recorded under the above heading. In this connection, it is especially desirable to ascertain the parents of each whenever possible, as well as the native locality, &c. This department is common to all kinds of fruits.

DIVISION SECOND—Form and Habit of Tree or Plant.

Although much neglected, this department is beyond a doubt of great value in deciding upon correct nomenclature. The many well-marked points of difference that have hitherto been deemed of trivial importance, are, when closely investigated, more reliable and trustworthy in many instances, than even the external appearance of the fruit itself.

Class I.—*Young Bark.*

Sec. a.—Color.
Sec. b.—Peculiarities.

Class II.—*Blossoms.*

Sec. a.—Size.
Sec. b.—Color.
Sec. c.—Shape.
Sec. d.—Arrangement.

Class III.—*Leaf.*

Sec. a.—Size.
Sec. b.—Color.
Sec. c.—Shape.
Sec. d.—Arrangement.
Sec. e.—Petiole or leaf-stem.
Sec. f.—Marked peculiarities.

Class IV.—*Branches.*

Sec. a.—Inclination.
Sec. b.—Shape.
Sec. c.—Length of internodes as in the grape.
Sec. d.—Marked peculiarities.

Class V.—*Wood Buds.*

Sec. a.—Size.
Sec. b.—Color.
Sec. c.—Shape.

Class VI.—*Spines.*

Sec. a.—Size.
Sec. b.—Color.
Sec. c.—Number.

Class VII.—*Fruit Spurs.*

Sec. a.—Character.

Class VIII.—*Roots.*

Sec. a.—Form and arrangement.

Class IX.—*General outline of tree.*

DIVISION THIRD—External Characteristics of Fruit.

These are the peculiarities or variations that appeal to the eye alone, and as a general rule, are less reliable in judging the fruit than the following division. They are, however, very necessary assistants, and should receive due care and attention. As almost every variety is more or less subject to changes in size, form and color, these should in all cases be accurately recorded.

Class I.—*Appertaining to most Fruits.*

Sec. a.—Size.
Sec. b.—Color.
Sec. c.—Shape.
Sec. d.—Skin.
Sec. e.—Peduncle or fruit-stalk.
Sec. f.—Calyx.
Sec. g.—Cavity, (surrounding Peduncle.)
Sec. h.—Basin, (surrounding Calyx.)
Sec. i.—Marked peculiarities.

Class II.—*Appertaining particularly to Grapes and Currants.*

Sec. a.—Size of Bunch.
Sec. b.—Shape of Bunch.
Sec. c.—Compactness of Bunch.
Sec. d.—Shoulders of Bunch.

DIVISION FOURTH—Internal Characteristics of Fruits.

These are the criterions that appeal to the palate and nostril in addition to the eye, and may be entitled to precedence in detecting all our varieties of fruits, being less liable to variation than most of the outward *signs or marks.*

Class I.—*Including all Fruits.*

Sec a.—Flesh, * Color.
" **Consistency.
Sec. b.—Juice.
Sec. c.—Flavor.
Sec. d.—Fragrance.
Sec. e.—Core.
Sec. f.—Seeds, *Size.
" **Shape.
" ***Color.
" ****Number.
" *****Peculiarities.

DIVISION FIFTH—Miscellaneous Characteristics of Fruits.

In addition to the foregoing specified list of characteristics, there are also others that are worthy of notice, viz: *Productiveness, rapidity of growth, early or late fruitfulness, average ripening season, and keeping qualities of fruits.* As these vary, however, in different localities, and on adverse soils, no definite standard can be given to serve as an infallible guide; but the variations should be accurately recorded whenever ascertained.

JOSIAH HOOPES, *Chairman,*
A. W. HARRISON,
THOMAS MEEHAN,
THOMAS M. HARVEY,
SAMUEL W. NOBLE,
Com. on Nomenclature, Pennsylvania Fruit Growers Society.

Laid on the table.

On motion of Mr. M'Crea,

J. B. Rutherford was unanimously elected Treasurer, and A. B. Longaker, Secretary, for the term of the next ensuing year.

Several propositions for the locatian of the next annual fair, from Pittsburg, Pottsville, Harrisburg, Erie and Norristown, were laid before the Committee, and finally referred to the Committee on Location, to be hereafter appointed.

On motion of A. B. Longaker, it was

Ordered, That the essay of Levi Flemming, Esq., upon Farm Accounts, shall be printed as part of the transactions of the society, and that a vote of thanks is hereby tendered for his valuable production.

On motion,

A premium of fifty dollars was awarded to Wm. B. Redfield, for his essay, as the best history of the fair held at Pittsburg for the year 1867, and that the report be published as part of the transactions of the society.

Mr. Rhey moved that this society shall refuse to locate the fair at any point, unless the locality bidding for the same shall agree to prepare the grounds in such a manner as shall be deemed necessary by the Committee on Location, and give them rent free, which motion was seconded by Mr. Knox.

On motion of Mr. M'Crea,

This motion was laid upon the table.

On motion, it was

Resolved, That a committee of five, of whom the President shall be one, shall be appointed, with power to locate the next fair, and that as soon as the location is agreed upon, the President shall appoint a Committee of Arrangements, consisting of five members, with full authority to make all necessary arrangements for the holding of the next fair, and to adopt such alterations in the premium list as they shall deem expedient.

On motion, it was

Ordered, That the usual meeting of the Executive Committee in June next shall be dispensed with.

On motion,

The report of Col. Wright, giving a history of the last fair, shall be published in the transactions of the society.

On motion,

It was agreed that when we adjourn we shall adjourn to meet on Thursday evening during the week of the next fair.

On motion, adjourned.

A. B. LONGAKER, *Secretary*.

AGRICULTURAL ROOMS,
HARRISBURG, *October* 1, 1868.

Third quarterly meeting of the Executive Committee.

Present—Messrs. M'Crea, Felton, Cummings, Cornell, Holstein, Sharpless, Barto, Kreybill, Brown, Sigman, Morris, Kapp, Bucher, Gehr, Russell, Trout, Rhey, Murdoch, Wright, Colder, Eby, Peters, Way, Ziegler, Haldeman, Knox, Rutherford, Haldeman, Gilbert, Rogers, Thompson, Longaker and Hamilton, President.

On motion,

The Executive Committee proceeded to examine and review the reports of the Committees on Awards.

On motion, it was

Resolved, That the society acknowledge the receipt of ten volumes of the transactions of the Michigan State Board of Agriculture.

On motion, it was

Resolved, That all silver medals be stricken from the awards, where the same are not provided for by the published specifications.

On motion,

The report of Committee, No. 23, was referred to the sub-committee, Messrs. Rhey and Morris, with full authority to act.

On motion, it was

Resolved, That the President, Secretary and Treasurer, shall be a committee to correct all errors in awards, and to refer all disputed and doubtful points, if any, to the January meeting.

On motion, adjourned.

A. B. LONGAKER, *Rec. Secretary.*

AGRICULTURAL ROOMS,
HARRISBURG, *January* 19, 1869.

The Executive Committee met at 7 o'clock P. M., and was called to order by the President, Mr. Hamilton.

Mr. Longaker, Recording Secretary, being absent.

On motion,

Mr. Ellis was chosen Secretary *pro tem.*

Present—Messrs. Cornell, Holstein, Sharpless, Barto, Kreybill, Brown, Sigman, Driesbach, Morris, Kapp, Bucher, Thompson, Ellis, Rhey, Bissell, Murdoch, Ziegler, J. S. Haldeman, Knox, S. S. Haldeman and Hamilton, President.

The minutes of the last meeting were read and approved.

On motion of Mr. Bissell, the following resolution was adopted:

Resolved, That a committee of three members be appointed by the President to bring before the society the subject of increased charges for memberships and admission to its exhibitions, with authority to report to the Executive Committee to be hereafter chosen.

Messrs. Bissell, Kreybill and Kapp were appointed said committee.

Messrs. Baker and Carter, delegates from the Experimental farm in Chester county, being present, were invited to seats on the floor.

On motion of Mr. Knox,

A communication from a committee in Chester county, relative to a cattle disease in that county, was read.

On motion of Mr. Rhey,

A committee of two was ordered to be appointed to examine the allegation that certain articles exhibited by Mr. Barto, of Berks, at the last exhibition, had been lost.

Messrs. Cornell and Driesbach were appointed said committee.

On motion of Mr. Rhey, the following resolution was adopted:

Resolved, That the President of this society do now appoint a committee of three to ascertain the result of our applications to the Legislature of Pennsylvania, during the past three years, for certain legislation desired by this society, essential to the interests of agriculture, and report the same at the meeting of the society.

Messrs. Rhey, Sharpless and Morris were appointed said committee.

Mr. Cornell read a paper advocating a convention of the agricultural societies of the State.

After debate, on motion of Mr. J. S. Haldeman,

Action was postponed until to-morrow.

On motion of Mr. Holstein, the following resolution was adopted:

Resolved, That a committee of three be appointed to draft the form of a general law to prevent cattle running at large, and that the committee be instructed to insert stringent penalties for infraction of the law.

Messrs. Holstein, Knox and S. S. Haldeman were appointed said committee.

The President then made the following statement, which was ordered to be inserted in the minutes of this day's proceedings, and which is as follows:

To the Executive Committee:

Four years ago the Pennsylvania State Agricultural Society, in its pleasure, elected me its presiding officer. It seems proper, upon the close of my relations to it in that capacity, that I should make a statement of its workings during the period it has been under my administration.

As to its means and property, at the settlement of the Treasurer's account in 1865, for the exhibition at Easton in 1864, the cash balance in the Treasurer's hands was $1,315\frac{43}{100}$, the treasury being without other resources, and as nearly as it was possible, all claims against the society had been liquidated; this under my respected predecessor. Since that date the balances have been

Cash at Williamsport, 1865	$1,091 18
Do. Easton, 1866	36 15
Do. Pittsburg, 1867	372 93
Do. Harrisburg, 1868	2 03

In 1865, after the exhibition at Williamsport, the society invested $5,000, subject to some unliquidated claims; in 1866 the cash balance from 1865 was lost, and $1,000 of the investment disposed of to make up the deficiency at Easton; in 1867 the cash balance from 1866 was lost, and twenty-five hundred dollars of the investment disposed of to make up the deficiency at Pittsburg; in 1868 the cash balance from 1867 was exhausted, and $1,000 of the investment disposed of to pay for the property at Harrisburg. The sum of all this is, that at present we have invested

In bond, with interest	$1,000 00
In note, with interest	800 00
In loose lumber and sheds	2,000 00
In tents and other property	600 00
	4,400 00

Of the two large buildings on the ground at Harrisburg, 32 by 64 feet each, three-fourths are the property of the society, as well as a number of stalls and pens, costing about $2,500; and together with the tents and other property useful in preparing for every exhibition, are insured for $2,325, which policy is in the hands of the Treasurer. I am assured by a builder that the loose lumber, the property of the society at Harrisburg, would sell for between 600 and 700 dollars at public auction; I think this a moderate estimate. Unless it is determined to hold an exhibition this year at Harrisburg, we should order sale of this loose lumber at an early day.

The receipts in cash for yearly memberships, single admissions and life memberships, have been for five years, as follows:

				Spectators.
1864.	Easton, yearly and single	$7,518 04		
	Life	310 00		
			$7,828 04	30,312
1865.	Williamsport, yearly and single	10,452 00		
	Life	2,020 00		
			12,472 00	49,888
1866.	Easton, yearly and single	8,689 69		
	Life	110 00		
			8,799 69	35,197

				Spectators.
1867.	Pittsburg, yearly and single.....	$15,723 43		
	Life	190 00		
		————	$15,913 43	53,653
1868.	Harrisburg, yearly and single....	8,821 33		
	Life...............	1,200 00		
		————	10,021 33	40,095
	Average spectators during five years....................			41,825

It is the opinion of the Secretary and Treasurer, in which I heartily concur, that the price of single admission should be increased. New York, in 1868, charged 40 cents; Ohio, Indiana and Illinois, a greater sum. And if this society had done the same, the number of visitors would not have been less numerous, and the treasury greatly strengthened.

From observation and the examination of accounts for five years, I have to remark that the price of all material and the preparation necessary to hold an exhibition, has advanced in that period nearly in the following ratio:

Transportation........	180 per cent.	Lumber..............	70 per cent.
Labor................	90 " "	Hardware............	40 " "
Executive Committee..	100 " "	Feed................	60 " "
Fuel.................	30 " "	Rents...............	30 " "
Printing.............	70 " "	Stationery..........	20 " "

whilst the fee for admission fixed in 1851 is yet the standard. In the face of unpropitious weather, and other risks, the waste attendant upon hurried and always incomplete preparations, this small rate needs adjustment as much as anything I know of to render any preparation safe against these and other risks. In my judgment a great reserve fund is not desirable, but the officers of the society should not be expected to make the preparations demanded by the public for one of its exhibitions restricted in funds, and hampered with other difficulties much more easily encountered than overcome, and only really known to one who has toiled through all the detail required in the settlement of our accounts.

This Committee has full power to adjust this, but I would recommend a committee of three to present the question to the society at large, that we may have its approbation if possible. I also recommend that a sale of all material not absolutely requisite for yearly use, be disposed of by the Secretary at as early a day as possible, after each annual exhibition, unless it is our pleasure to hold two shows in following years at the same point, as has been the successful practice of the State Society of Ohio. Under its plan no point can be duplicated but twice in eight years, and practically but once in twelve years.

It is also the opinion of the Secretary and Treasurer, in which I concur, that duplicate premiums, in separate numbers, should not be continued. At Pittsburg and Harrisburg it cost the society about $800. If one-half of this amount had been offered in sweepstake premiums—"for the best"—in cattle, horses, sheep or swine, equal satisfaction would have been given exhibitors. As it now stands on our catalogue, the liberality of the society is liable to be abused by any calculating exhibitor.

It is my opinion that the salary of the Secretary should be increased, and provision made for keeping the office open during the winter, and after an exhibition at least one month.

That the salaries of assistants to the Secretary and Treasurer, to be employed during exhibitions, should be fixed—say, $100 each; that the wages of employees under each of these officers—clerks, $5 per day, and for gatekeepers, &c., $3 per day; that no employee of the society should be boarded at the expense of it, except the assistance named above, to wit: one for the Treasurer and two for the Secretary. In case the engagements of the President are such as to prevent his attendance, as Auditor of Accounts, it would be proper, and I think within the power of this body, to appoint some one to perform this duty for him, and it might devolve, with great propriety, upon the Vice President residing in the district in which the exhibition is held.

The President should be relieved from all unnecessary details; but if he performs all that our charter appears to contemplate it is his duty to do, he should be paid, and no one else; but this is not the practice, and the routine devolves upon the Secretary, for which he ought to be fully paid. The President of this society is *ex-officio* membre of the Board of Trustees of the Agricultural College. During my term of office much attention has been given to this duty, making this the more necessary because the institution was laboring under many pecuniary and other difficulties. Under prudent management the former will not long exist, and under new auspices, other difficulties, principally in the educational department, will soon disappear, and this college take rank as a leader in the agricultural training of those who design to farm both practically and scientifically.

In 1864 the number of life members was less than 300. The present number is about 750, residing in all parts of the State.

An examination of the library shows that one or two of the series of volumes of its transactions are nearly exhausted, and this Committee will soon find difficulty in answering demands for sets, unless in a very limited way.

Thus far the New York, Ohio, Missouri, Michigan, Indiana, Illinois, Iowa, New Jersey and California State Societies have been supplied; also the Agricultural Bureau, as well as the Agricultural colleges of several

States, our own, and the libraries of many of the county agricultural societies. I most respectfully decline a re-election and heartily thank this Committee, and through it the society, for kindness at all times, and especially for its support during my term of office.

A. BOYD HAMILTON.

HARRISBURG, *January* 8, 1869.

In accordance with the requirements of the charter, the president announced the following appointments:

To audit the treasurer's account—Messrs. Murdoch and Barto.

To conduct the election—Messrs. Bucher, Judge, and Thompson and Driesbach, Tellers.

After hearing excuses for non-attendance from Messrs. Gowen, Trout, Longaker, M'Crea, Felton, Russell, Cummings and Wright, the Committee adjourned until to-morrow morning at ten o'clock.

AGRICULTURAL ROOMS,
HARRISBURG, *January* 20, 1869,

The Committee met pursuant to adjournment of yesterday.

Mr. Cornell, from the special committee appointed to inquire into the liability of the society to pay for certain goods lost at the late fair, submitted the following report:

The committee appointed to take into consideration the matter of the loss sustained by goods being stolen during the last fair, do not feel that the society can be held liable for any loss sustained, when the goods lost are under the care of the owner in transit—but as the goods when stolen were in charge of one of your Committee, (he having assumed the custody by courtesy only,) to be exhibited for the benefit of the society, we therefore exonerate Mr. Barto from all responsibility, and recommend that Mr. David Cooper be reimbursed to the amount of $25.

(Signed) ADRIAN CORNELL,
D. G. DRIESBACH.

The report was adopted, and the Treasurer directed to pay Mr. Cooper, through Mr. Barto, the sum mentioned above.

Mr. Holstein, from the committee to draft the form of a law relative to enclosures, made a partial report, and had leave granted to present such draft, when completed, to the proper committee of the Legislature.

Mr. Rhey, from the committee to make inquiries relative to certain legislation, made a report, which was ordered to be submitted to the society at its meeting this afternoon.

Mr. Bissell, from committee relative to increase of charges for life and yearly memberships, and single admissions to the exhibitions of the society, made report, which was ordered to be submitted to the society at its meeting this afternoon.

On motion,

Mr. Brown and Mr. Thompson were appointed a committee to examine into the complaint of the Lycoming County Agricultural Society, who, after examination, made the following report:

Your committee having examined committee book No. 34, the letters of Messrs. Longaker and Wolfinger to Mr. Ellis, and the offer of the society for a premium for the best six or more varieties of fruit, to be exhibited by six or more persons, complying with certain conditions, and believing that the Lycoming County Agricultural Society, through their chairman, B. Morris Ellis, have complied with these conditions, in exhibiting more than 60 varieties of fruit, would recommend the adoption and award of the premiums to the Lycoming County Agricultural Society, as recommended by Mr. Wolfinger, chairman of committee No. 34, before the matter was handed over to Mr. Bird, chairman of committee No. 30.

GEO. W. BROWN,
JNO. I. THOMPSON.

The report was adopted, and the Treasurer directed to pay said society, by Mr. Ellis, the sum of $33.

On motion,

Messrs. Rhey, Murdoch and Ziegler were appointed a committee to lay before the Legislature an application to print the reports and papers of the society.

Mr. Holstein submitted the following resolution:

Resolved, That the sincere thanks of this Committee, and through it, of the Pennsylvania State Agricultural Society, are hereby tendered to the retiring President, A. Boyd Hamilton, Esq., of Harrisburg, for his industrious, economical and intelligent administration of the laborious trust confided to him. Adopted unanimously.

The Committee then adjourned *sine die*.

AGRICULTURAL ROOMS,
HARRISBURG, *January* 20, 1869.

This day at 1½ o'clock, the time designated for a meeting of the members of the Pennsylvania State Agricultural Society, and more than a quorum of members being present, the President took the chair and called the meeting to order.

The election for officers for the ensuing year was opened.

During the progress of said election, the committee appointed to audit the Treasurer's statement made the following report:

John B. Rutherford, *Treasurer, in account with the Pennsylvania State Agricultural Society.*

DR.

1868.			
Jan.	18.	To balance in treasury	$372 93
		To interest on 5-20 bonds	80 10
July	15.	Do......do....do	84 20
Oct.	1.	To 120 life memberships	1,200 00
		Proceeds of exhibition at Harrisburg, from single admission tickets, yearly memberships, &c	8,827 33
		State appropriation	2,000 00
		Sale of 5-20 bond	1,090 00
		Amount received on account of Allegheny note	450 00
			14,098 56

Investments.

5-20 U. S. bond	$1,000 00
Allegheny note	800 00

CR.

Rent of office at Harrisburg	$200 00
Printing	773 86
Expense of Executive Committee	1,036 29
Secretary's office, clerks, stationery, &c	1,425 25
Treasurer's office, ticket-sellers, gate-keepers, &c	570 60
Premiums paid for 1867	42 00
Do......do.. 1868	2,793 00
Diplomas	285 00
Superintendence	234 35
Entertainment of Committee, &c	665 10
Preparation of grounds, decorations, &c	1,333 70
Lumber and carpentry	3,413 98
Police	575 07
Transportation	298 33
Secretary's salary	300 00
Treasurer's salary	150 00
Balance	2 03
	14,098 56

Harrisburg, *January* 4, 1869.

Audited and approved. [See Treasurer's book of accounts.]

TOBIAS BARTO,
JOHN MURDOCH.

Mr. Rhey, from special committee, made the following report:

Your committee respectfully report, that during the past two years this society has asked for the following legislation, viz:

First.—An appropriation sufficient to defray the expenses incident to a trial of implements for farm purposes, which would enable our farmers to secure those of most value.

Second.—An appropriation sufficient to pay for the publication of the transactions of this society.

Third.—An appropriation sufficient to defray the expenses of a competent chemist, to ascertain and report some effectual plan for utilizing the wasted fertilizers of this State.

Fourth.—An act compelling the assessors of this State to report to the commissioners of the several counties the statistics of production, embracing the products of the soil, and all descriptions of farm stock.

Fifth.—Such amendments to the road laws as will result in the improvement of our public roads.

Your committee regret to be compelled to report that the Legislature has thus far failed to grant any of the favors asked for.

Deeming it very important to secure favorable action on each of the above named subjects, we recommend continued efforts to that end, and respectfully suggest the adoption of the following resolution as likely to aid in that direction:

Resolved, That a committee of four be now appointed to memorialize the Legislature as soon as possible, asking for favorable legislation in the foregoing particulars, believing the best interests of the public will be promoted thereby.

GEORGE RHEY,
SAMUEL J. SHARPLESS,
JOHN C. MORRIS.

After consideration the report and resolution were adopted.

The committee appointed under the resolution to consist of Messrs. Rhey, Sharpless, Morris and Hamilton, President.

Mr. Bissell, from the special committee relative to increase of charges for life and yearly memberships and single admissions, reported as follows:

The committee to whom has been entrusted the consideration of the proposed change in the prices of admission, beg leave to report the following arithmetic, which seems to be conclusive to them as to the expediency of the proposition:

Average amount of tickets sold at exhibitions for past five years, say 41,800, at 25 cents	$10,450 00
Same number at 50 cents	20,900 00

Therefore, your committee are of opinion that the price for adult admission should be advanced to fifty cents. The committee have no hesitation in urging this recommendation, in view of the large advance in cost of labor and all the material aid required in the get up of the society's annual exhibitions, and to produce this result would therefore offer the following resolution, viz:

Resolved, That the prices for admission to the annual exhibitions of the society hereafter be fixed at fifty cents for each adult single admission; also that the price of the annual membership be advanced to two dollars and life membership to twenty dollars.

All of which is respectfully submitted by the committee.

W. S. BISSELL,
J. E. KREYBILL,
A. E. KAPP.

After consideration, the report and resolution attached thereto was adopted unanimously by the society.

Mr. Cornell submitted the following resolution:

Resolved, That a convention of the County Agricultural Societies be called by the President and Secretary of this society, to meet with the Executive Committee of the State Agricultural Society, at their meeting to be held the third Wednesday of March, 1869, in connection with the President and Trustees of the Agricultural College, and Managers of the Model Farms of Pennsylvania, also the committees on Agriculture of the Senate and House of Representatives of the Legislature of the State of Pennsylvania, to facilitate an intelligent expression as to the best mode of attracting attention to, and advancing the productive power of the varied soil and climate of the Keystone State.

After consideration, the resolution was agreed to.

Mr. Bucher, Judge of election, then made report of result as follows:

PRESIDENT.

Amos E. Kapp	64 votes.
John C. Morris	40 do.

VICE PRESIDENTS.

1st District	James A. M'Crea	104 votes.
2d....do	George Blight	104 do.
3d....do	Samuel M. Felton	57 do.
	W. Heyward Drayton	48 do.
4th...do	A. B. Cummings	104 do.
5th...do	Adrian Cornell	104 do.
6th. ..do	C. P. Relf	63 do.
	W. H. Holstein	42 do.

7th District—	Samuel J. Sharpless	104 votes.
8th....do....	Tobias Barto	104 do.
9th....do....	Jacob E. Kreybill	104 do.
10th....do....	Martin Earley	65 do.
	George B. Brown	39 do.
11th....do....	Joseph Sigman	104 do.
12th....do....	Daniel G. Driesbach	104 do.
13th....do....	George D. Jackson	65 do.
	George Scott	38 do.
14th....do....	John A. Smull	65 do.
	Amos E. Kapp	39 do.
15th....do....	George H. Bucher	104 do.
16th....do....	Daniel O. Gehr	104 do.
17th....do....	John I. Thompson	104 do.
18th....do....	B. Morris Ellis	103 do.
19th....do....	Henry Souther	65 do.
	H. W. Russell	39 do.
20th....do....	James C. Brown	65 do.
	Michael C. Trout	38 do.
21st....do....	George Rhey	104 do.
22d....do....	John Murdoch, Jr	104 do.
23d....do....	William S. Bissell	104 do.
24th....do....	Joshua Wright	104 do.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

(Five to be elected.)

William Colder	99 votes.
Jacob R. Eby	99 do.
B. G. Peters	104 do.
John H. Ziegler	90 do.
D. W. Seiler	65 do.
John Way, Jr	37 do.

CORRESPONDING SECRETARY.

Elbridge M'Conkey	65 votes.
A. B. Longaker	37 do.

CHEMIST AND GEOLOGIST.

S. S. Haldeman	104 votes.

LIBRARIAN.

Lucius Rogers	102 votes.

January 20, 1869. We certify the foregoing to be the result of the election held this day.

GEO. H. BUCHER, *Judge.*
JOHN I. THOMPSON, } *Tellers.*
D. G. DRIESBACH, }

Whereupon the society adjourned, at 6 P. M., until the third Wednesday in January, 1869.

AGRICULTURAL ROOMS,
HARRISBURG, *January* 20, 1869.

The newly elected Executive Committee met at 6½ o'clock P. M.

Present—Messrs. Barto, Sigman, Driesbach, Bucher, Thompson, Ellis, Rhey, Murdoch, Bissell, Ziegler, M'Conkey, Seiler and Hamilton; being more than a quorum, proceeded to organize.

The President elect being absent, the meeting was organized by electing Mr. A. B. Hamilton, President, and Mr. Ziegler to act as Secretary *pro tem.*

Mr. Bissell moved that a sub-committee, to consist of three, be appointed to advertise that proposals for holding the next exhibition will be received by it, or any member of said committee; said proposals to be laid before the Executive Committee at its meeting on the third Wednesday of March, 1869.

After consideration, the resolution was agreed to, and Messrs. Kapp, Longaker and Hamilton were appointed said committee.

On motion,

The Committee adjourned to meet March 17, 1869, at 10 o'clock A. M.

JOHN H. ZIEGLER, *Secretary pro tem.*

AGRICULTURAL ROOMS,
HARRISBURG, *March* 17, 1869.

Second quarterly meeting of the Executive Committee.

Present—Messrs. M'Crea, Cummings, Cornell, Sharpless, Barto, Early, Sigman, Driesbach, Jackson, Smull, Bucher, Thompson, Ellis, Souther, Brown, Rhey, Murdoch, Wright, Eby, Seiler, Ziegler, Knox, Hamilton, M'Conkey, and Kapp, President.

The minutes of the last meeting of the Executive Committee, and the annual meeting of the society, were read and approved.

On motion,

An election for Recording Secretary, for the ensuing year, was ordered, for which office the following persons were nominated, viz: A. Boyd Hamilton, Lucius Rogers and William H. Holstein.

Mr. Hamilton declined to be put in nomination, or to accept the office if elected.

The nominations were closed, and the election held, with the following result:

Messrs. Cummings, Cornell, Sharpless, Barto, Sigman, Driesbach, Bucher, Thompson, Ellis and Ziegler—10, voted for A. Boyd Hamilton.

Messrs. Smull, Jackson, Souther, Brown, M'Conkey and Seiler—6, voted for Lucius Rogers.

Messrs. Hamilton and Kapp—2, voted for William H. Holstein.

The result of the vote being in favor of Mr. Hamilton,

Upon motion,

A call of the roll was had, and all the members present voted to make the election *unanimous.*

On motion,

J. B. Rutherford, Esq., was unanimously elected Treasurer for the ensuing year.

The declination of S. M. Felton, Esq., Vice President elect from the Third district, was laid before the Committee and accepted.

Whereupon,

On motion of Dr. M'Crea,

W. Heyward Drayton, Esq., of Philadelphia, was unanimously chosen to fill the vacancy.

Mr. M'Conkey presented a letter from C. P. Relf, Esq., Vice President elect from the Sixth district, declining to serve in consequenee of ill-health, and moved that the vacancy be filled by the election of Wm. H. Holstein.

Which was unanimously agreed to.

The President laid before the Committee a letter from Ex-President Gowen, regretting his inability to attend the meeting.

Mr. Hamilton, Chairman of Committee on Proposals for fair of 1869, submitted proposition of D. J. Unger, of Harrisburg; and Judge Parke and Mr. Patrick, a committee from the Allegheny County Society, being present, made statements in behalf of that society, urging its location at Pittsburg.

Mr. Smull offered the following resolution, which was adopted:

That a committee of five, including the President and Recording Secretary, be appointed by the President, to whom shall be referred all matters relating to the holding of a State Agricultural exhibition, with full power to fix a time and place for holding the same, and make all necessary arrangements in relation thereto; which committee shall also have authority to re-arrange and publish the premium lists, and appoint such sub-committees of arrangements as they may deem proper.

Committee appointed under the above resolution, Messrs. Kapp, Seiler, Dreisbach, Rhey and Sharpless.

On motion,

The June quarterly meeting was dispensed with.

Colonel Knox, on behalf of committee relative to cattle running at large, reported that it had performed its duty, by preparing a bill which had been submitted to the Legislature, where it has been read in place and referred to the Committee on Agriculture.

On motion,

The committee was discharged from the further consideration of the subject.

Mr. Rhey, chairman of committee on matters of legislation, reported that the Legislature had been memorialized, and submitted a copy of the memorial, which was read and ordered to be filed for publication:

To the Honorable the Senate and House of Representatives of the Commonwealth of Pennsylvania:

Your memorialists, a committee acting in pursuance of a resolution passed at the annual meeting of the Pennsylvania Agricultural Society, January 20, 1869, instructing us to present to you the considerations which have influenced its members the past two years in asking the following legislation, respectfully ask your patient attention to our petition.

The society has asked for the following legislation, viz:

1st. An act compelling assessors to report annually to the commissioners of the several counties the statistics of production.

2d. An appropriation sufficient to defray the expenses of a trial of agricultural implements.

3d. An appropriation sufficient to pay for the services and expenses of a competent chemist, to devise and report some practical plan for farmers to utilize the wasted fertilizers of this State.

4th. Such amendment to our road laws as will result in the improvement of our public roads.

5th. The publication of the transactions of the State Agricultural, Horticultural and Wool Growers Societies.

The population of Pennsylvania is now estimated at over four millions. More than one-half this number is engaged in agriculture. In appealing to you for legislation, in behalf of so large a portion of the laborers of our State, it is not for the purpose of securing for them special privileges at the expense of any other class, but simply to obtain such laws and such knowledge as will enable them to accomplish the best possible result for their industry.

The laws asked for cannot add to the public burdens permanently. Your petitioners believe, (and hope to impress you with similar convictions,) that an accurate knowledge of the annual agricultural products of our State, the permanent improvement of our public roads, the general dissemination of the knowledge requisite to enable our farmers to use the night soil, the bones and other fertilizers, now wasted, in increasing the products of their land, and the introduction of the best agricultural implements, will result in such large increase in the produce of our farms as to compensate the public thereby amply for the small amount which may be invested in pursuance of our petition.

The Commissioner of Agriculture conceives it of such importance to inform the public of the annual agricultural products of our country, as to collect the information by comparative observations. We suggest to you that this information, so far as Pennsylvania is concerned, may be obtained with absolute certainty, without any increase in taxes, by enacting a law requiring the assessors to report the same to the county commissioners when they report their assessments. We submit to you that a *certainty* is more reliable and satisfactory than a *speculative opinion* upon this subject.

The night soil, resulting from the four million human beings in this State, amounts to at least seven hundred thousand tons annually. The bones, the flesh, the blood of the millions of animals slaughtered, and the victims of disease and accident, amount to a much larger quantity. One ton of these fertilizers properly prepared will afford to vegetable life almost as much nutriment as five tons of ordinary barn-yard manure. Nearly all these sources of fertility are at present wasted, for the reason that our farmers generally do not know how to prepare the articles for use. This waste will continue, unless science through your instrumentality, stops it. The very small quantity which is at present used costs the farmers fifty to seventy-five dollars per ton, this large price being either profit to the manufacturer, or the expense of transportation to the manufacturer and its return to the farmer. It is certainly needless for us to elaborate this subject, to demonstrate to your satisfaction the great importance to the public of devising some plan by which these vast sources of agricultural wealth can be made generally and economically available.

The farmers of Pennsylvania are not mechanics. They cannot, by an examination of its construction, determine the value of an agricultural implement; and a practical test, conducted, as it always is, by the manufacturer, is not conclusive as to its absolute value. It may be better than that which the farmer has used, and yet be comparatively worthless. The hundreds of manufacturers engaged in the production of all the various agricultural implements, now necessary to successful husbandry, claim superior excellence each for his own handiwork, and yet there is one better than all others. How can this one be detected? How is the farmer to know it from the vast multitude presented to his view, so similar in construction as to defy the scrutiny of any but the most skillful judge? Certainly only by a comparative test, under the supervision of persons competent, by their scientific knowledge, their skill in the mechanic arts and the practical realities of farm life, to perceive accurately the relative qualities of each. To illustrate to you the entire impossibility of any farmer being able to ascertain, from a trial of any one implement, its relative value to others of its kind, we will ask your careful attention to the following reflections upon one of the simplest of implements—the plow: To determine which one of all the thousands made, will enable the farmer to prepare his ground so as to produce the largest possible result to him, so far as that implement is concerned, it would be necessary for him to try all the different kinds. To do this successfully, he must assemble aid enough to observe and record the time occupied in the trial, the depth of the ground plowed, the extent of the ground plowed, the manner in which the furrow was turned, the amount of motive power required to move the plow through the ground, which can be indicated by an accurate dynamometer alone, most scrutinizingly observed, and finally, a thorough revision of the mechanical construction of the implement. Need we go further to convince you that this is practically impossible. Such a trial cannot be made by any one farmer. How much more difficult would it be to make a trial of the mowing machine and reaper. How entirely impossible it is for our farmers to know when they are buying the best implement of any kind under existing circumstances. The consequence is our State is filled with inferior implements. Our farmers are toiling profitlessly to produce from exhausted fields, with defective implements, the necessaries of life, the basis of health and prosperity to all other industries, and when the result of their labor is ready for market, in ignorance of the relation of supply and demand, and at the mercy of the well instructed speculator, they are compelled to drag it over bad roads to the consumer. Believing the legislation we ask for will result in increased fertility to our lands, improved machinery and better modes of cultivation, much larger results for the labor devoted to agriculture, increased intercourse and intelligence among this large portion of our fellow citizens, we most earnestly pray your favorable consideration of our petition.

On motion of Mr. Smull,

To take the sense of the Executive Committee as to the propriety of recommending to the society the propriety of reducing the fee for life memberships to ten dollars.

The yeas and nays were as follow:

YEAS—Messrs Kapp, Cornell, Sigman, Smull, Eby, Seiler, M'Conkey and Rutherford—8.

NAYS—Messrs. M'Crea, Sharpless, Barto, Driesbach, Bucher, Ziegler, Thompson, Ellis, Rhey, Murdoch, Wright, Knox and Hamilton—13.

So the motion was lost.

On motion of Mr. Sharpless,

To limit the number of life member checks to five; amended by Mr Ziegler, that no checks shall be issued at all.

Which motion as amended was carried.

On motion of Mr. A. B. Hamilton, it was resolved, as follows:

That at the coming fair all entries (except horses entered in the speed classes) shall be free. Exhibitors shall not be allowed exhibitor or attendant tickets; but exhibitors shall each have the privilege of purchasing five tickets for one dollar, for their own use or the use of their attendants, and and shall have the privilege of purchasing not more than twenty tickets during any exhibition at the same reduced rates; and the officers shall frame regulations to carry this resolution into effect.

On motion,

H. N. M'Allister, Esq., was introduced on behalf of the Agricultural College, and submitted a statement relative to the general and financial condition of the institution.

Whereupon the thanks of the Committee were tendered to Mr. M'Allister, and a copy of his report requested and ordered to be filed for publication.

The time for holding the next annual exhibition was fixed on the days of September 28, 29, 30, and October 1, 1869.

Mr. Hamilton, the newly elected Recording Secretary, submitted his declination, which was accepted, and, on motion of Col. Knox, D. W. Seiler, of Harrisburg, was *unanimously* elected to fill the vacancy.

On motion of Dr. M'Crea,

Hon. A. B. Longaker was substituted to fill a vacancy in the Executive Committee created by the declination of Mr. Seiler, the newly elected Recording Secretary.

Messrs. Ellis and Morris, committee in the matter of the premium for best herd of "Swine," reported that said premium was due and should be awarded to Edward B. Ashbridge, of East Goshen, Chester county, which report was adopted.

On motion, adjourned.

A. B. LONGAKER, *Rec. Secretary.*

AGRICULTURAL ROOMS,
HARRISBURG, *September* 30, 1869.

The meeting of the Committee was called to order by the President, at 7½ o'clock P. M.

Present—Messrs. Cummings, Cornell, Holstein, Sharpless, Barto, Kreybill, Early, Sigman, Driesbach, Smull, Bucher, Ellis, Rhey, Bissell, Murdoch, Wright, Eby, Longaker, Ziegler, J. S. Haldman, Knox, A. B. Hamilton, M'Conkey, S. S. Haldeman, Seiler and Kapp, President.

On motion of Ex-President Haldeman,

A committee of three was appointed to wait upon Governor Geary and Hon. Asa Packer, to receive and escort them to the fair grounds.

Agreed to.

The President appointed Messrs. J. S. Haldeman, Holstein and Eby.

Mr. Knox made a statement that the committee on plows and plowing in 1868, awarded two silver medals to two plowmen, and that said committee had exceeded their authority.

When, upon motion of Mr. Haldeman,

It was agreed that each be awarded a bronze medal.

Mr. M'Conkey offered the following resolution, which was agreed to:

Resolved, That the Chemist and Geologist of this society be authorized to appoint an official assistant in his department, to be approved by the Executive Committee.

Also, that a life membership be voted Mr. Hugh Hamilton, together with the thanks of the society, for his gratuitous services during the past five years.

Agreed to.

Mr. Haldeman moved that a bronze medal be awarded to Thomas Worsley, of Philadelphia, for his fine display of fancy soaps.

Agreed to.

Mr. Holstein moved that a diploma be awarded to Hause & Berry, of Philadelphia, for their patent elastic horse collars, in place of a money premium.

Agreed to.

Mr. Wright moved that a committee consisting of Messrs. Hamilton, Bucher, Cornell, Morris and Ellis be appointed to revise and correct the awards of the several committees.

Agreed to.

Mr. Knox moved that it be discretionary with committee No. 44, to award diplomas in place of money premiums, where they think proper.

Agreed to.

Mr. A. B. Hamilton moved that the President, the two Secretaries and Treasurer, be appointed a committee to dispose of the property of the society on the fair grounds.

Amended by Mr. Bucher, that the same committee be authorized to settle all bills, &c.

Agreed to.

On motion of Mr. Barto,

The premiums due Mr. Odikirk were directed to be paid without reference to the revisionary committee.

D. W. SEILER, *Rec. Secretary.*

Agricultural Rooms,
Harrisburg, *January* 18, 1870.

The meeting was called to order by the President, and the following gentlemen answered to their names:

Messrs. M'Crea, Cummings, Cornell, Holstein, Barto, Kreybill, Driesbach, Smull, Bucher, Thompson, Ellis, Rhey, Murdoch, Ziegler, Hamilton, J. S. Haldeman, M'Conkey, Seiler and Rogers.

The minutes of last meeting were read and adopted.

Mr. Cornell asked for the report of the committee to audit and pay premiums in Classes No. 1, 2 and 3, but owing to the absence of the Treasurer no report could be made.

Mr. A. B. Hamilton offered the following resolution:

Resolved, That it be recommended by the committee of the Pennsylvania State Agricultural Society, to be chosen at the annual election, January 19, 1870, to strike from the specification in No. 1, premium list for 1869, the words "best herd thoroughbred."

2. For the best thoroughbred bull, over three years old, imported or bred in the United States, together with three or more cows or heifers, over two years old, imported or bred in the United States, $75 00.

3. No herd will be considered in competition unless an authenticated pedigree of the animals, supported by the herd-book or certificates of well known breeders, shall have been deposited with the Secretary when the entry is made.

4. The animals exhibited as component parts of a herd will have the privilege of competing individually for specific premiums, in their proper classes and numbers.

Agreed to.

Mr. A. B. Hamilton offered the following additional resolution:

Resolved, That in specification No. 3, the words, "Ayrshire, Alderney, Holstein, and all other thoroughbred cattle not in 1 and 2," shall be, "Alderney, to include Brittany, Normandy, and all the channel islands; Ayrshire, to include all Scotch cattle; Holstein, to include all Dutch cattle, and all thoroughbred, to include every native or foreign-bred of the full blood, fully authenticated."

Agreed to.

On motion of Mr. M'Conkey,

The special premium awarded to Benjamin Oldweiler, in class No. 2, and approved by the revisory committee, was directed to be paid by the Treasurer.

Mr. A. B. Hamilton moved that in Class No. 15, but two premiums be offered hereafter:

For best plowman	$10 00
For best plowboy under eighteen years of age	10 00

All the balance to be ruled out.

Agreed to.

Mr. M'Crea offered the following resolution :

That the society hereafter shall not offer premiums for the second best of any animal or article, but establish the principle that the best of any kind only shall be awarded a premium.

Not agreed to.

Mr. Rhey offered a resolution to consider the expediency of the society purchasing three tracts of land, to be located in the eastern, western and central parts of the State, to be fitted up with permanent buildings, improvements, &c., whereon exhibitions should be held alternately.

After considerable discussion, the resolution was, by consent of the mover, referred to the consideration of the Executive Committee to be elected for 1870.

The following committee was appointed, on motion of Mr. Holstein, to audit the accounts of the Treasurer for 1869 :

Messrs. Holstein, Barto and Thompson.

The following committee was appointed by the President to hold election for officers for the year 1870 :

Messrs. Smull, Murdoch and Ellis.

On motion of Mr. Holstein,

Adjourned to January 19, at ten o'clock A. M.

HARRISBURG, *January* 19, 1870.

The meeting was called to order by the President at 10 o'clock A. M., the following members present:

Messrs. M'Crea, Cummings, Cornell, Early, Holstein, Barto, Kreybill, Driesbach, Smull, Bucher, Thompson, Ellis, Rhey, Murdoch, Ziegler, J. S. Haldeman, A. B. Hamilton, M'Conkey, Seiler, Rogers and Rutherford.

Mr. A. B. Hamilton offered the following resolution:

In Class No. 11, to insert the word "not," in the fourth line after the word "will," so as to read "will not be allowed to compete."

Amended by motion,

That a special committee of three, with Mr. Hamilton as chairman, be appointed to take the subject into consideration, and report at the March meeting.

Committee appointed as follows:

Messrs. A. B. Hamilton, Ellis and Thompson.

Mr. Holstein moved that a committee on essays and reports be appointed under the premium list of 1869.

Committee appointed—Messrs. A. B. Hamilton and Cummings.

Mr. Barto from the committee to audit the accounts of the Treasurer, announced the readiness of said committee to report, and that the committee had concluded its duties, and approved the accounts, which is as follows:

JOHN B. RUTHERFORD, *Treasurer, in account with the Pennsylvania State Agricultural Society.*

DR.

1869.		
January 20.	To balance in treasury	$2 03
	Interest on 5-20 bonds	40 35
	Sale of 5-20 bond, ($500)	537 50
	Sale of 5-20 bond, ($200)	215 50
	Four life memberships	40 00
March 17.	Sale of 5-20 bond, ($300)	339 00
October 2.	Proceeds of exhibition at Harrisburg, from yearly memberships, single admissions, &c.	10,333 70
	State appropriation	2,000 00
	Sale of Allegheny Society note	695 00
	Sale of lumber	366 75
	Life membership, J. W. Hutchison	20 00
	Total	14,589 83

CR.

By rent of office at Harrisburg	$200 00
Printing	1,179 05
Expense of Executive Committee	666 92
Secretary's office, clerks, stationery, postage, &c	1,150 77
Treasurer's office, ticket-sellers, gate-keepers, &c	532 75
Premiums of 1868	179 00
Do 1869	3,039 00
Diplomas and medals	310 72
Superintendents, forage, &c	836 29
Entertainment of committees, &c	580 30
Preparation of grounds, water and decorations	1,583 12
Lumber and carpentering	2,132 68
Police	681 75
Transportation	487 91
Labor	529 23

By Secretary's salary	$300 00
Treasurer's salary	150 00
Balance	50 34
	14,589 83

The vouchers for the above have been separately examined, and found to be correct.

WM. H. HOLSTEIN,
JOHN I. THOMPSON,
TOBIAS BARTO,
Committee.

JANUARY 19, 1870.

Mr. Bucher, chairman of the Committee on Winter Crops, reported as follows:

The committee on winter crops, viz: Messrs. Bucher, Cornell, Rhey and Driesbach have examined the items of grain and potatoes exhibited by C. W. Griest, who is the only exhibitor, and who has complied with the requirements of the society. The committee have, therefore, awarded him

For the best five acres of corn, being 87⅞ bushels per acre	$20 00
Do.....one acre of corn, being 88 bushels per acre	10 00
Do.....five acres of oats, being 76½ bushels per acre	15 00
Do.....one acre of oats, being 82½ bushels per acre	10 00
Do.....half acre of clover seed, being 2 bushels per acre	10 00
Do.....acre of potatoes, being 289 bushels per acre	20 00
Do.....half acre of potatoes, being 340 bushels per acre	10 00

The committee recommend that hereafter the requiremts shall be, for the best five acres of corn, not less than seventy-five bushels per acre; the best one acre, not less than eighty bushels; the best five acres of oats, not less than seventy-five bushels per acre; the best acre, not less than eighty bushels.

In behalf of the committee.

GEO. H. BUCHER, *Chairman.*

On motion of Mr. Thompson,
The Committee adjourned.

HARRISBURG, *January* 19, 1870.

The society met at four o'clock P. M. Mr. Hamilton in the chair, and Mr. M'Conkey was appointed Secretary.

The tellers appointed to conduct the election for officers for 1870, Messrs. Murdoch, Ellis and Smull, reported the following named persons to be duly elected as the Executive Committee, for the year 1870, they having received all the votes cast.

PRESIDENT—John C. Morris.

VICE PRESIDENTS.

1. James A. M'Crea.
2. George Blight.
3. W. Haywood Drayton.
4. James N. Marks.
5. Adrian Cornell.
6. Wm. H. Holstein.
7. Chalkley Harvey.
8. Tobias Barto.
9. William L. Peiper.
10. Martin Early.
11. Joseph Sigman.
12. Daniel G. Driesbach.
13. George Scott.
14. John A. Smull.
15. J. D. Bowman.
16. C. M. Duncan.
17. John I. Thompson.
18. B. Morris Ellis.
19. Lucius Rogers.
20. J. D. Kirkpatrick.
21. George Rhey.
22. John Murdoch.
23. William S. Bissell.
24. David M'Cracken.

ADDITIONAL MEMBERS OF EXECUTIVE COMMITTEE.

J. R. Eby.
B. G. Peters.
John H. Ziegler.
A. B. Longaker.
Michael C. Trout.
Frederick Watts.
James Gowen.
Thomas P. Knox.
David Taggart.
Jacob S. Haldeman.
A. Boyd Hamilton.
Amos E. Kapp.

CORRESPONDING SECRETARY—Elbridge M'Conkey.

CHEMIST AND GEOLOGIST—S. S. Haldeman.

LIBRARIAN—George Bergner.

HARRISBURG, *January* 19, 1870.

The newly elected Executive Committee met at 4.30 P. M.

Present—Messrs. Holstein, Barto, Early, Driesbach, Smull, Thompson, Ellis, Rogers, Rhey, Murdoch, Ziegler, Haldeman, Hamilton, Kapp, M'Conkey and Seiler.

There being more than a quorum present, the Committee proceeded to organize.

The President elect being absent, the meeting organized by the election of Mr. Hamilton President *pro tem.*

Mr. Ellis moved that a committee of three (3,) to consist of Messrs. Hamilton, Seiler and M'Conkey, be appointed to dispose of the property of the society at the fair ground.

On motion, adjourned to meet March 16, at 2 P. M.

D. W. SEILER, *Rec. Secretary.*

HARRISBURG, *March* 16, 1870.

The quarterly meeting of the Executive Committee was called to order by the President.

The following members present—Messrs. M'Crea, Holstein, Barto, Peiper, Early, Sigman, Driesbach, Scott, Smull, Bowman, Duncan, Thompson, Ellis, Rogers, Kirkpatrick, Rhey, Bissell, Murdoch, Eby, Trout, J. S. Haldeman, Hamilton, M'Conkey, Rutherford, Bergner and Seiler.

The minutes of last meeting were read and approved.

Mr. Ellis moved that Joshua Wright be declared elected a member of the Executive Committee from the Twenty-fourth district, which was agreed to.

A motion was made to proceed with the election of Recording Secretary and Treasurer, which was postponed until 7½ o'clock P. M.

Mr. Hamilton, one of the committee on the disposal of the property of the society, reported, when Mr. M'Crea moved that the committee have full power to dispose of all property belonging to the society in such a manner as they may deem best. The committee consisted of Messrs. Hamilton, M'Conkey and Seiler, and, on motion, the President was added to the committee.

A committee, consisting of Messrs. M'Crea, Hamilton, M'Conkey and the President, was appointed to revise the premiums in Class No. 7, and ordered to report to the meeting this evening at 7½ o'clock.

Adjourned.

7½ *o'clock*, *March* 16, 1870.

After the meeting was called to order by the President, Mr. Smull offered the following resolution:

Resolved, That a committee of five, including the President and Recording Secretary, to whom shall be referred all matters relating to the holding of the next State Agricultural Society's exhibition, with full power to fix a time and place for holding the same, and make all necessary arrangements in relation thereto, which committee shall have authority to re-arrange and publish the premium lists, and appoint such sub-committees of arrangements as they may deem proper.

Mr. M'Crea moved to amend by inserting seven, in place of five, which was agreed to.

Mr. Hamilton moved to increase the number of the committee to nine.

Agreed to.

On motion of Mr. Holstein,

Mr. M'Conkey was added to the committee.

The President appointed the following members said committee: President Morris, Rhey, Driesbach, Ellis, Bissell, Ziegler, Holstein, Smull, M'Conkey and Seiler.

The propositions from Pittsburg and Scranton were submitted, and after discussion, referred to the Committee on Location.

Mr. Smull moved that we proceed to the election of Recording Secretary and Treasurer for the ensuing year.

Agreed to; when

Mr. Longaker moved that Mr. Seiler be elected Recording Secretary by acclamation.

Agreed to.

For Treasurer—Mr. Rhey nominated J. B. Rutherford.
Mr. Ellis nominated John H. Ziegler.

On the vote—	J. B. Rutherford had	15
	J. H. Ziegler had	4

On motion of Mr. Bissell,

The election of J. B. Rutherford was made unanimous.

On motion of Mr. Rhey,

The committee to revise Class No. 7 was ordered to report to-morrow.

Mr. Smull amended, as follows:

That the above committee report to the Committee on Revision of the Premium List and Location.

Agreed to.

Mr. Rhey offered the following:

Resolved, That in view of the fact that the Executive Committee of this society are required to make (in the discharge of the duties of their position) frequent trips to all parts of the State, without any compensation for their services, the President of this society is directed to ask of the railroads of the State free passes for the President, Vice Presidents and Secretary of this society from said railroads; which was amended by inserting in place of "President" "Messrs. Longaker and Smull," and adding to said resolution the following: "For their meetings and visits to the Agricultural College and exhibitions."

The resolution as amended was agreed to.

Mr. Hamilton moved that when we adjourn it will be to meet at 10 o'clock to-morrow morning.

On motion,

The 27th, 28th, 29th and 30th days of September were fixed for our next exhibition.

Mr. Ellis offered the following resolution:

Resolved, That a committee of three (3) be appointed to visit the farm purchased by the trustees of the Agricultural College, in Indiana county, and report the result of their observations at their next meeting.

Amended by Mr. Murdoch as follows: "And also visit the Eastern Experimental farm and report, &c."

The resolution as amended was agreed to.

Messrs. Kirkpatrick, Bissell and Early were appointed that committee.

Mr. Smull offered the following resolution:

Resolved, That the Committee of Arrangements be directed to advertise for one month for proposals for holding the next fair, and to require the grounds for holding the same to be furnished, completely fitted up under the direction of the committee, free from expenses to this society, and to award the holding of the fair to such place as shall, in addition thereto, agree to donate the largest amount of money, not counting the sale of life memberships, which shall be done for the society for its own benefit.

Referred to the Committee on Location.

Mr. Hamilton offered the following resolution, which was agreed to:

Resolved, That the officers (the President, Secretaries and Treasurer) be authorized to borrow six hundred dollars ($600) in the name of the society, and use the seal of the society; the amount so borrowed to be in paying off the indebtedness, and to be re-paid by the sale of the property of the society.

On motion,

The June meeting was dispensed with.

The meeting adjourned.

D. W. SEILER, *Rec. Secretary.*

AGRICULTURAL ROOMS,
SCRANTON, *September* 29, 1870.

A special meeting of the Executive Committee was held at the office of the President, on the exhibition ground, at ten o'clock A. M.

The death of Adrian Cornell, Esq., late a Vice President of the society, having been announced,

Upon motion of Mr. A. Boyd Hamilton, it was

Resolved, That this committee has heard, with sincere regret, of the demise of one of its oldest and most active fellow-members. His efficiency and activity were marked characteristics of his career both in his public and private life; his intercourse with his colleagues urbane; his advice direct and practical; his death a surprise and regret to those who have associated with him during many years of official intercourse. Elected an officer of the society in 1856, and during all this period an industrious and attentive member of this committee, his counsel and his suggestions were of high value in the conduct of its affairs. The death of such a citizen is a public bereavement, and an especial cause of sorrow to the Executive Committee of the Pennsylvania State Agricultural Society.

Resolved, That the President and Secretary transmit a copy of these proceedings to the family of Mr. Cornell, under the seal of the society.

After remarks by Messrs. Knox, Rhey, Barto, Ellis and the President, the resolutions were unanimously adopted, and the committee adjourned.

SAME DAY—EVENING.

The third quarterly meeting of the Executive Committee was called to order by the President, at 7½ o'clock P. M.

Present—Messrs. Holstein, Barto, Peiper, Early, Sigman, Driesbach, Scott, Smull, Bowman, Thompson, Kirkpatrick, Rhey, Bissell, Murdoch, Longaker, Trout, Knox, Hamilton, Kapp, Bergner, M'Conkey, Seiler, Rutherford and Morris, President.

Mr. Driesbach offered the following resolution:

Resolved, That the thanks of this society are due, and are hereby tendered to the business community of the city of Scranton, and its vicinity, for the very general suspension of their business, during Thursday, that their employees might have an opportunity to attend our exhibition, and for the excellent order preserved by the vast crowd upon the ground during the day.

Agreed to.

Mr. Holstein offered the following resolution:

Resolved, That the thanks of the Executive Committee are due to the ladies of Scranton and vicinity, for the interest manifested, and valuable services rendered in making the fair a success.

Agreed to.

On motion of Mr. Barto,

Mr. W. H. Reynolds was awarded a diploma for his gelding, for heavy draught, and Mr. Akerley, also one for his stallion.

The remaining reports of committees in the several classes were then read and adopted, without any change.

Mr. M'Conkey moved that in consideration of repeated courtesies received by the Executive Committee at the hands of George W. Rand, Esq., of Scranton, that he be voted a life membership of the society.

Agreed to.

Mr. Peiper moved that each of the secretaries be voted $500, in view of services rendered the society.

Mr. Murdoch moved to postpone the consideration of the motion until the January meeting, upon which the yeas and nays were as follows:

YEAS—Messrs. Driesbach, Thompson, Ellis, Rhey, Murdoch, Hamilton, Sigman and Morris, President—8.

NAYS—Messrs. Holstein, Barto, Peiper, Early, Smull, Kirkpatrick and Knox—7.

On motion, adjourned.

AGRICULTURAL ROOMS,
HARRISBURG, *January* 17, 1871.

The fourth quarterly meeting of the Executive Committee was called to order by the President, at 7½ o'clock P. M.

Present—Messrs. M'Crea, Blight, Holstein, Barto, Peiper, Early, Driesbach, Scott, Smull, Bowman, Duncan, Thompson, Ellis, Rogers, Kirkpatrick, Bissell, Murdoch, Eby, Trout, Knox, Hamilton, Kapp, M'Conkey, Rutherford, Bergner and Seiler.

The minutes of the last meeting were read and adopted.

Mr. Kirkpatrick, from the committee appointed at the March meeting, to visit the Eastern and Western Experimental farms, asked leave to report to-morrow. Which was granted.

Mr. Hamilton offered the following resolution, which was seconded by Mr. Holstein:

Resolved, That the Pennsylvania State Agricultural Society is of the opinion that prompt measures should be taken by the Legislature to secure a new geological survey of the State, and on behalf of its agricultural interests, join in the recommendation of the Governor, in his last annual message, in favor of early provision for this object.

Resolved, That a copy of this resolution be transmitted to both Houses of the Assembly by the President, attested by the Secretary.

Mr. Smull moved that the Secretary be empowered to purchase from A. B. Hamilton, twenty (20) full sets of the reports of this society.

Agreed to.

Mr. Kirkpatrick, on behalf of the Mercer County Agricultural Society, reported the resolutions of that society, in reference to the printing of the transactions of the State society, by authority of the Legislature.

Mr. Smull then read the original resolution passed several years since, which failed to become a law.

Mr. M'Conkey then offered the following resolution:

Resolved, That a committee of five (5) be appointed to prepare a suitable bill, memorializing the Legislature to publish the proceedings of this society, to and including the year 1870, with instructions to report the same to the meeting of the Executive Committee to-morrow.

Agreed to.

And Messrs. Smull, Bergner, Hamilton, Kirkpatrick and Knox appointed as the committee.

The resolution in reference to the salary of the secretaries, postponed at the last meeting, was called up, and on motion of Mr. Seiler, was again postponed.

Mr. Hamilton from the committee appointed at the last March meeting to dispose of the property of the society, at the Harrisburg Park grounds, reported that the committee had up to this time been unable to make any arrangement with the party owning the other undivided interest, and moved that the committee be continued, with full power to dispose of said property as they may deem best.

Agreed to.

Mr. Bergner offered the following resolution:

Resolved, That the officers of this society be directed to settle the amount due this society by certain citizens of the city of Scranton, in accordance with the contract made with them by the Committee of Arrangements; amended by Mr. Kirkpatrick, to report at the March meeting.—The resolution as amended was agreed to.

Mr. Knox stated to the meeting that Ex-President Kapp and himself were invited to visit the Georgia State fair at Macon; and being desirous that this society should take some action in reference to the kind treatment and courtesy extended to them as representatives of this society, he therefore moved

That the Secretary be directed to acknowledge the courtesies extended and shown by that society to the representatives of this society, and that they be invited to visit our next annual exhibition.

Passed unanimously.

Mr. Hamilton moved that the President appoint the judge and tellers to conduct the election to-morrow, as well as the regular committee to audit the Treasurer's account for the current year.

Agreed to.

Mr. Bissell was appointed judge of the election, and Messrs. Trout, Driesbach and Scott tellers.

Messrs. Blight, Murdoch and Barto were appointed committee to audit the Treasurer's account.

On motion, adjourned.

Agricultural Rooms,
Harrisburg, *January* 18, 1871.

The meeting convened at ten o'clock A. M., and in the absence of the President, A. B. Hamilton was called to the chair.

The reading of the minutes was dispensed with.

Mr. M'Conkey offered the following resolution:

Resolved, That in appreciation of repeated kindnesses extended, and valuable assistance rendered this society at the late fair at Scranton, by D. T. Bound, Supt. L. and B. R. R., and Wm. F. Hallstead, Supt. D. L. and W. R. R., that life memberships be voted them, and the Secretary be directed to notify them accordingly.

Amended by Mr. Holstein, to include the names of J. N. DuBarry, Vice President N. C. R. R., and A. R. Fiske, Supt. N. C. R. R., which amendment was accepted, and passed unanimously.

Mr. Bergner, chairman of committee to whom was referred the resolution to prepare a bill for printing the reports of the society by the State, submitted the following:

The committee appointed upon the subject of a form of printing the unpublished reports of the society, beg leave to state that in its opinion the form should be similar to the six volumes already published; that the proceedings and other valuable and useful matter intended to be embraced therein should be prepared under the direction of the officers of this society, condensed as much as practicable; that application should be made separately for printing the same to each branch of the Legislature, and that the number of copies asked for should be one thousand (1,000) on the part of the Senate, and two thousand (2,000) on the part of the House, including three hundred (300) copies for the use of this society, two hundred (200) for the Fruit Growers Society and one hundred (100) for the Wool Growers Society.

On motion, the report was accepted.

Mr. Holstein, from Committee on Winter Crops, reported, and, on motion, the report was accepted.

Mr. Kirkpatrick then submitted the report of the committee appointed to visit the experimental farms last June, when Mr. Murdoch moved that it be accepted, filed and included in the minutes of the meeting.

Report of a Special Committee of the Pennsylvania State Agriculturaj Society, appointed to visit the Eastern and Western Farms of the Agricultural College.

The undersigned, committee appointed at the meeting of the Executive Committee of the Pennsylvania State Agricultural Society, in March last, 1870, to visit the Eastern and Western Experimental farms, having performed that duty in June last, beg leave to report as follows:

WESTERN EXPERIMENTAL FARM, INDIANA COUNTY.

The Western farm, adjoining the borough of Indiana, in Indiana county, containing 121 acres, contains quite a diversity of soil, a part of it being on quite high ground and a small but constant stream of water flowing through another part of it. Along the banks of this stream are several acres of land on which underdraining will have to be resorted to. The soil appears to be good and, with the exception noted above, sufficiently dry for ordinary culture. The general appearance of the farm would indicate that it had been, until quite recently, very much neglected, but is now being put into much better order. A new entrance from the highway to the farm buildings was just completed. The residence of the superintendent was being thoroughly repaired; a large lot of old lumber was carefully piled up in one corner of the barn-yard which had been torn from the barn, and a large compost heap reached from end to end of the barn-yard. A very extensive diversity of experiments were in progress, and all looked to be in a flourishing and progressive condition. A concise statement of the number of experiments was to have been furnished your committee, but for some cause has not been received.

Taking into account the length of time the farm has been running, and the condition in which it was when bought for the present purpose, your committee think that much credit is due the superintendent for the energetic manner in which he has discharged his duty, and anticipate results from this farm highly satisfactory to all parties concerned.

Your committee would beg leave to suggest that some means be taken to afford a much better supply of both live stock and agricultural implements to this farm, believing that it would better serve the purpose sought to pay more attention to dairy farming.

EASTERN FARM, WEST GROVE, CHESTER COUNTY, PA.

This farm appears to have been in a very high state of cultivation previous to its purchase for an experimental farm, being well stocked with fruit trees, (particularly pears,) grape vines, &c. The buildings, also, are of unusual excellence, so far as they go, and new and desirable buildings are in course of erection under the supervision of the superintendent, Mr. Harvey, who seems to be eminently qualified for the position he occupies.

The farm is well supplied with implements but deficient in live stock. What animals they have, however, appear to be of a desirable quality.

As to the experimental part of the farming, agriculture proper appears to predominate, the superintendent claiming that they cannot yet afford to keep a gardener or any other *skilled* laborer. This is to be regretted, as a carefully conducted series of experiments in horticulture and its kindred branches, would, no doubt, be highly interesting to the farmers of Pennsylvania.

In wheat we found ninety-five diversities, viz:

Different fertilizers	38
Varieties of wheat	43
Different ways of planting	14

Of oats forty-four diversities, viz:

Fertilizers	14
Varieties	30

Of corn one hundred and fifty-seven diversities, and of barley eighteen diversities.

These experiments appear to be most carefully conducted, and their results cannot fail, under more favorable circumstances, to be productive of great benefit to the cause of agriculture.

We would hereby tender our thanks to the superintendents of both Eastern and Western farms for their courtesy in showing us over their farms, and doing everything in their power to make our visit a pleasant one.

W. S. BISSELL, *Allegheny county.*
MARTIN EARLY, *Lebanon county.*
J. D. KIRKPATRICK, *Mercer county.*

JANUARY 1, 1871.

Mr. Hamilton asked the consent of the Executive Committee to attach and embody this report in the report of the Agricultural College of Pennsylvania.

And the report was adopted.

Mr. Knox moved that the Corresponding Secretary be authorized to ascertain the extent of the cattle disease, and report at the next meeting.

Dr. M'Crea and Ex-President Kapp were added to this committee.

Mr. Eby presented the memorial of George W. Parsons, on behalf of the agricultural implement manufacturers and exhibitors, asking a revision of the premium list in Classes Nos. 14, 15, 16 and 17, and the awarding of premiums for the best implements and machines, as follows:

This memorial, to the Executive Committee of the Pennsylvania State Agricultural Society, respectfully represents, that the policy of this society for several years past in the matter of the exhibition of agricultural implements and machinery, and awarding of premiums for the same, has caused considerable dissatisfaction to the majority of the manufacturers of this important class of improvements, sufficient to demand that you try to discover and to remove the cause.

Your memorialist believes that the resolutions of January, 1866, and March, 1867, have been carried into effect in a manner and to a degree that was not contemplated when the resolutions were adopted. Examination of premium list in Classes 14, 15, 16, 17 and 18, shows there are no premiums at all offered, although those classes include very many machines and implements which can be tested on the fair ground as well and practically as even on the farm, and all such as are found worthy should have some *specified* premium, suitable to the importance of the article. Every article mentioned in the list should have some premium mentioned and advertised for it, and all those not tested would be debarred by the resolution, notwithstanding such advertisement. Manufacturers would then have an incentive to bring out their improvements, and provide means of testing them, also, as they would feel there was a chance of carrying home some more *substantial* token of merit than "*honorable mention*" in a committee's report.

It also seems important to have committees of mechanical experts to examine the construction, materials, &c., of all those articles, and to report as to mechanical superiority one may have over another in all those points that pertain to the "life" of the machine.

It is not necessary to amplify upon the great importance of the labor-saving implements and their development and perfection to the farming interests of our State, nor upon the importance of having the largest possible displays of them at our exhibitions, as you are all aware of the facts, and trusting you may deem the matter referred to worthy of your attention, your memorialist remains,

Respectfully yours,
GEO. W. PARSONS, (life member.)

On motion,

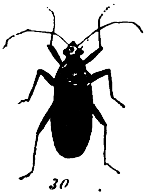
It was referred to a committee consisting of Messrs. Holstein, Kirkpatrick and Hamilton, with instructions to report at next meeting.

The committee appointed to audit the account of the Treasurer, announced that they would conclude their duties, and asked permission to report to the Executive Committee to be elected at its meeting this evening.

On motion, adjourned *sine die.*

D. W. SEILER, *Recording Secretary.*

EXTRACTS FROM PAPERS OF THE SOCIETY.



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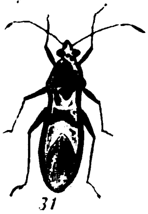

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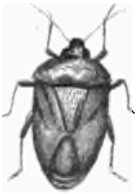

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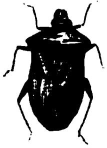

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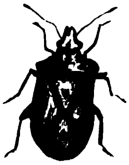

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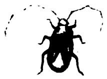

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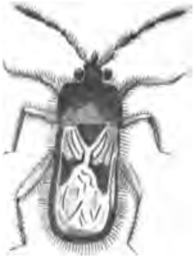

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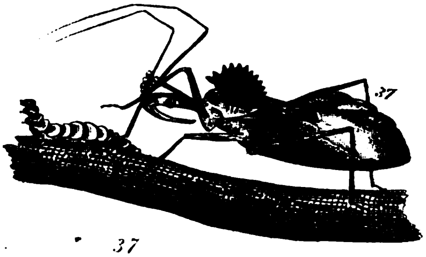

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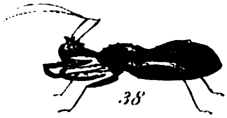

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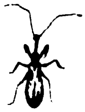

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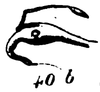

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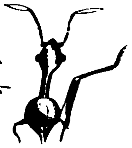

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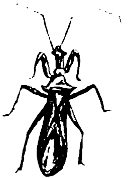

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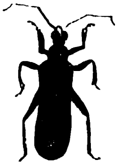

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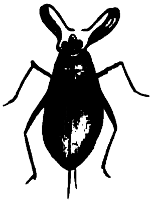

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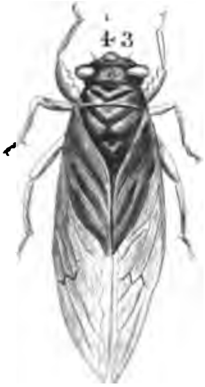

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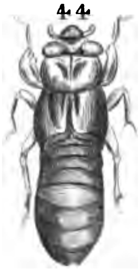

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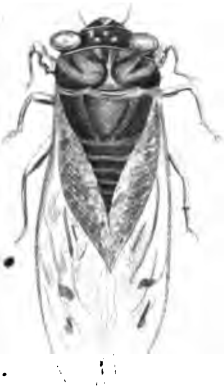

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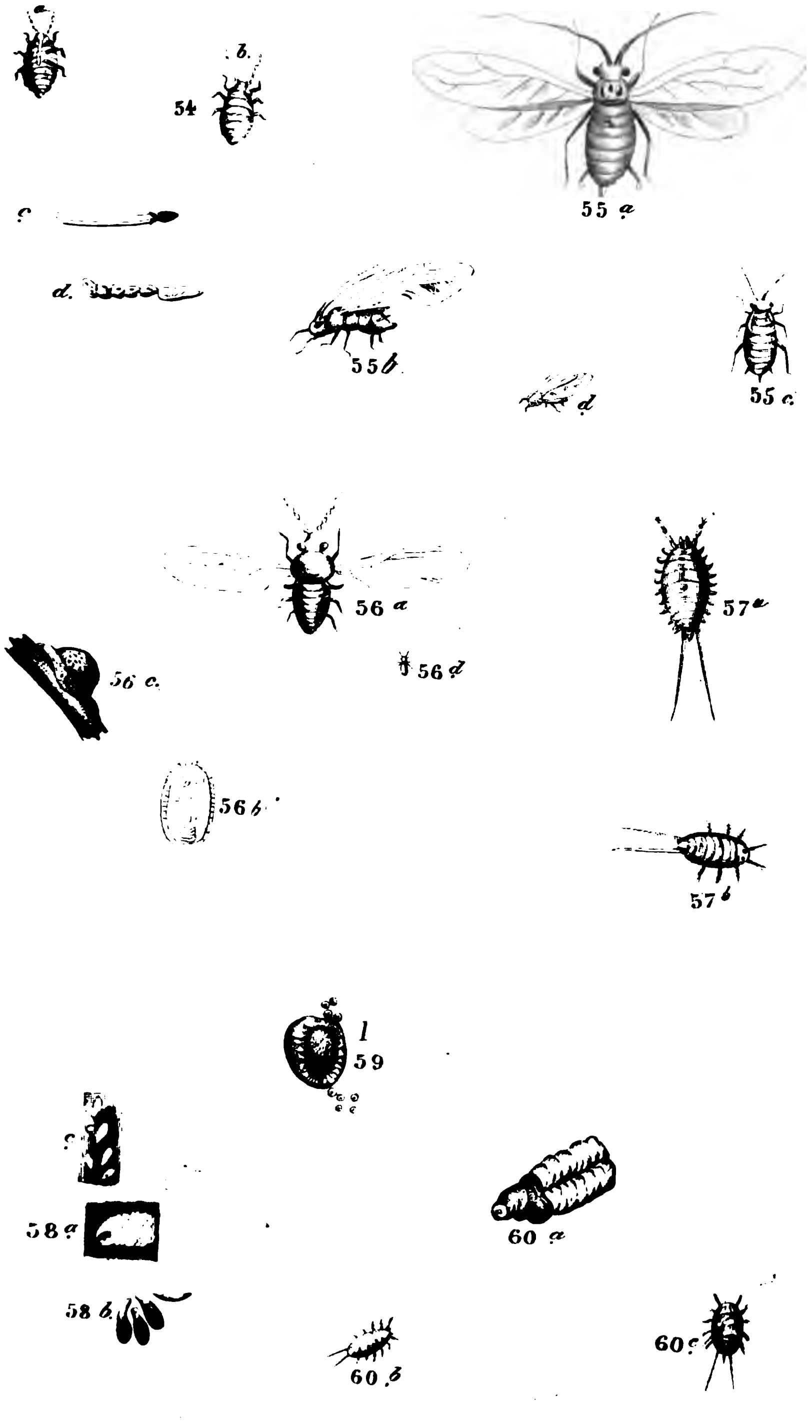
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ORDER HEMIPTERA, OR "BUGS."*

[BY S. S. RATHVON, M. D., OF LANCASTER.]

The insects belonging to this order differ essentially in their structure from both the *coleoptera*, or "beetles," and the *orthoptera*, or locusts, grasshoppers, &c., approximating, however, towards the last named in their transformations. These insects are perhaps the only ones to which the term "bug" may properly apply. The former orders named are "mandibulated insects; that is, they are provided with *mandibles* or jaws, opening and closing horizontally, by which they masticate their food or bore or cut their way through hard substances; but the *hemiptera* are "haustellated insects;" that is, they are provided with a *haustellum*, or tube, instead of jaws, by means of which they perforate vegetation, human beings or animals, and suck out their juices or blood, infusing into the wound more or less poisonous matter, causing considerable pain, or causing vegetation to wilt in some instances as though it had been scalded. The term "*hemiptera*" means half-wings, because the true hemiptera have the one-half of their upper wings or wing-covers opaque and leathery, whilst the other, or terminal half is transparent or membranaceous. The wing-covers do not unite in a straight *suture* down the back, as in the *coleoptera*, but on the contrary, one laps over on the other. As all these characteristics do not uniformly apply to all the individuals belonging to this order, therefore entomologists have divided it into two orders, or sub-orders, namely, the *hemiptera heteroptera* and the *hemiptera homoptera*. Basing my remarks, therefore, upon this division of the order, the *heteroptera* will be first briefly considered, and afterwards the *homoptera*. Suffice it to say for the present, that the same general plan of noting the noxious and the innoxious kinds will be here continued, and attempts will be made to point out their distinctions, so that the common reader may attain to a practical knowledge of their destructiveness and their usefulness, and be enabled to apply the necessary remedies against the one, and protect the other.

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* This essay was written some years ago, and since then some changes have been made in the scientific nomenclature, and also some additional facts have been developed; but nothing that alters any point essential to the interests of the farmer and fruit grower. And as the main object has been to assist them in recognising their insect *friends*, as well as their *foes*, these characteristics will not be essentially impaired by time, or any additional facts which time may develop. However interesting and useful the latest scientific names may be, still the agriculturist is most interested in the external *forms* of insects, their histories, how, when and where they originate and multiply, what they do, and how they may be exterminated. S. S. R.

Within the narrow limits to which these remarks will be confined, of course, only a few of the more common and easily recognized species can be considered, but these few will be sufficient to form a tolerably correct epitome of the whole order. Nearly all, if not all, the *heteropterous hemiptera* hybernate during the winter, hiding themselves in old out-houses, in old fences, under the bark of trees, under stones, in short in any crack or crevice that is capable of admitting them, where they remain in perfect safety until the approach of spring, when they come forth and prey upon vegetation or upon other insects, and deposit their eggs, which produce a new brood. The survivors most generally die shortly after the birth of the new brood, but these continue, and produce several generations during the summer. These insects multiply more rapidly during a dry season than during a wet one, and vegetation, being more weak under such circumstances, when the insects are the most numerous, therefore it then also suffers the most. I am persuaded that very few of these insects are eaten by birds or any other animals, nor do the predaceous kinds usually destroy each other, there being a disagreeable, pungent, if not poisonous odor about them, that renders them obnoxious to "fish, flesh and foul." They are not confined to domestic or garden vegetation in their depredations, wild vegetation and field culture coming in, sometimes, for a large share. When the season has ended and succulent vegetation has become exhausted, the females, and sometimes both sexes, seek a hiding place, as before stated; but if such a place becomes wet or much dampened, and continues long so, it is very detrimental to the health of the bug, as I have found, on many occasions, that those so circumstanced were entirely destitute of vitality. This may be a useful hint to those who have suffered from the incursions of these depredators.

It is not esteemed necessary in this paper to pursue the distinct routine of *family*, *genera* and *species* into which this section of the order has been classified and arranged, but at the same time systematic arrangement need not be unnecessarily disregarded.

I cannot find in the whole catalogue of this division of the order *Hemiptera*, a more appropriate illustration of all that is hateful and destructive among "bugs"—not even the well-known *bed bug* itself—than is represented in fig. 30, (*Coreus tristis*) the common "squash bug," known to the Eastern, Western, Middle and Southern States of our Union. This insect is equally destructive to all kinds of squash, pumpkin, cucumber and melon vines, but more partial to some kinds than to others. For instance, where I have cultivated the Cushaw squash and the Valperaiso in the same enclosure, I have found the former invariably the greatest sufferer, but cantelopes and cucumbers were preferred even to this. When full grown, the squash bug attains to about half an inch in length, and is of a sober grayish black color above, and a dirty ochery color beneath.

As soon as the young vines are up in the spring, and may have escaped from or withstood the attacks of the "striped beetle," *(Diabrotica vittata,)* these squash bugs will be found issuing from their various hiding places and wending their way towards the squash or melon patch, where they immediately proceed to deposit their eggs in clusters upon the lower side of the leaves of the vines, to the number of fifty or a hundred at a place. These eggs when first deposited are yellow, but soon change to a glossy brown, and are so thoroughly cemented to the surface of the leaves that they can scarcely be removed without the aid of the thumb nail or a blunt edge knife, without doing serious injury to the vine. The eggs are not all deposited at the same time, but at intervals, so that insects of various stages of growth may be observed on the same vine at the same time, all engaged in the common work of destruction.

When these insects are first excluded from the egg state, which is usually in four or five days after they are deposited, if the weather is favorable, they appear to be merely a central neucles, surrounded by legs, antennæ and beak, and then continuing for some time in little communities, they puncture the leaves in their immediate vicinity and suck out the juices, which, as the insects grow older and larger, causes them to wilt and fall, as if they had been scalded, and finally to dry up and become crispy. When no more leaves remain for them to prey upon, they even attack the main stem and the fruit, but if permitted to multiply with impunity, there will not be much fruit liable to their attacks, for its production will be entirely prevented. When these insects pass through two or three of their moultings, and attain to about half their growth, they begin to scatter and become more solitary in their operations, carrying destruction wherever they go. The last generation of these insects reach the adult stage during the months of September and October, when they seek hiding places and hybernate during the winter, but come forth into the sun, if there is a succession of two or three warm days, as often as such periods occur.

There has been no remedy yet discovered to destroy these insects that will not also destroy the vines upon which they are found, except *manual labor*. The husbandman, therefore, being made acquainted with the *form* of the insect and its *habits*, should himself form a habit of killing it at any time and place he may encounter it, either in winter, spring or summer, for by this means he may prevent a deposition of a multitude of eggs, and the hatching of the young that may in time be excluded from them. Vines known to be infested with these insects should be visited daily, and the eggs or young crushed, as well as the old, otherwise they cannot be reclaimed. They are so offensive that no bird or beast will assist him in this, therefore he must be left entirely alone in his labors.

Any system of culture that is calculated to produce a rapid and healthy growth of the vine, will, in the same degree, defeat the efforts of the "squash bug" in its depredations. Dry seasons and situations, which usually operate detrimentally to the vegetating progress of these vines, are favorable to the increase of the bugs.

If ever, in the history of our country, and its domestic demands, it should become necessary to cultivate the "wild cotton," *(asclepius,)* for the sake of the fibre it yields, an enemy to the plant will be found in an insect that is of about the size and approaches in *form*, to the one last described. It is the *Lygœus aulicus*, fig. 31. The prevailing colors are black and red, and so deep and distinct is the outline of these colors, that the insect becomes of easy recognition in consequence thereof, giving it a sort of "harlequin" appearance. The thorax is black, edged laterally with red; a broad black band extends across the middle of the upper wings, and the apical termination is also largely black, having the base of the wings and the space between the middle band and the terminus red. The feet and antennæ, are black, and the thorax and abdomen beneath are red, largely marked with black. This insect is sometimes found almost as abundantly as the squash bug, and is destructive to the vitality of the plants it infests. As soon as a class of plants become subjects of domestic culture, that approximate to those on which it is now most frequently found, it is possible that this insect may become as much an object of aversion as the one before-named. But the same means recommended for the final extermination of the former, would be none the less necessary and effectual in the latter. It has been merely introduced on account of its destructive proclivities. Its length is nearly three-quarters of an inch.

Another "plant bug" about seven-eighths of an inch in length, and three-eighths broad, and of an entire grass-green color, is represented by fig. 32. *Nezara hilaris.* The lower side of this insect is a whitish or yellowish green, and the thorax and a part of the lateral margin of the wing-covers are edged with a very narrow margin of rose-red or pink. These insects are not yet so numerous as the two foregoing species, but they are becoming more common than formerly, and are now very frequently found on grape vines, on domestic vegetation, in gardens and adjacent fields.

Similar in form and habits, not so large in size, but more abundant in numbers, is a species of "plant bug" illustrated by fig. 33. *Euschiles punctipes.* This insect is sometimes found very numerously on the wild blackberry, and if on *this*, of course there is no reason why it should not also visit the cultivated blackberry or raspberry. It does not confine itself however to the blackberry, but may also be found on various species of other vegetation, but cultivators of the Lawton and other varieties of this lucious and healthful berry, cannot be admonished too early of the existence of even an anticipated enemy.

This blackberry bug is about five-eighths of an inch in length and one-quarter of an inch broad across the base of the thorax. The under side is a greenish yellow—in some specimens the yellow predominates—and the whole of the upper side is a light or dirty mahogany brown.

The arbor plant bug is allied to the two foregoing in form, size, and habits; it is however much wider across the terminal portion of the abdomen, and horizontally more obtusely rounded. The thorax is proportionately not so wide, and the head is more drawn out, snout like, terminating with two obtuse points. Fig. 34. *Brachymena arborea* represents the "arbor bug." It is fully seven-eighths of an inch in length, and nearly half an inch broad. The color is a dark cinereus or ashen gray, deeply punctured all over, and the lateral margins of the thorax are serrated or bluntly spined. Not so numerous as any of the former species described, but still capable of becoming a formidable enemy. But there are other smaller and more numerous species belonging to this division of *Hemiptera* that sometimes do great damage to garden and nursery culture, as well as to that of the fields. Fig. 35. *Capsus rapidus* is one species in question, a small insect not more than about one-quarter of an inch in length, and of a dirty yellowish or light brown color. This insect and an allied species, *Phytocerus lineolaris*, of the same size and nearly the same color, but having in most cases a letter V of a lighter color on its back, are often very injurious to young trees in the nurseries in early spring. An intelligent nursery man of Lancaster county informed me that in a single week in the spring of 1860, about four hundred apple and pear buddings had been destroyed by these insects. Later in the season these insects puncture succulent vegetation and suck out its juices, but early in the spring, before vegetation has made its appearance, when the genial rays of a vernal sun cause the young buds of apple, pear and other fruit trees to swell, then they sometimes come fourth in thousands from their winter quarters, and being somewhat famished from their long fast, they attack these young buds, making one puncture after another, sucking out their sap, and leave them entirely dead, and as porous as a piece of sponge. A theory had been promulgated by a gentleman in the State of New York some years ago, in some manner connecting these insects, and especially the last named, with the *potato rot*, but it needed experience and corroborative testimony to confirm it. Whatever may be the cause of the "potato rot," I feel convinced that these insects are not; but independent of this, they are capable of doing a vas deal of injury.

As a remedy against them, slaked lime, put in a porous bag, and dusted on the young trees in such places as are most desired to be preserved, would doubtless have a very good effect. This dusting should be done immediately after a rain, while the branches are wet, or after they had been wetted by artificial means. Decoctions of tobacco or snuff might have the same effect, but neither of these remedies would be as cheap as the lime.

The western "chinch bug," fig. 36, *Micropus Leucopterus*, belongs to this division of the order hemiptera also. This is a small narrow black bug, with white closed wings, a black dot on the middle of the outer edge, and is not more than three-twentieths of an inch in length. Although this insect is now comparatively a stranger to the middle and eastern States, yet it has been a most formidable enemy to the wheat crops of the western States, and is also a common pest in the south, where wheat and corn are grown. This insect appears to have been noticed in this country first, in North Carolina, immediately after the Revolutionary war, and was supposed to have been brought over from the continent of Europe, by the German soldiers, at the same time they brought the "hessian fly." These insects attack all kinds of vegetation, but are partial to wheat; and as soon as this plant becomes too ripe, they desert the field and take to the oats, which subsequently gives away to the corn or grasses. They attack the wheat and other vegetation by stinging it with their sharp beaks, and sucking out its juices, turning the stalk prematurely yellow, and preventing the filling of the grain, sometimes compelling farmers to set fire to the fields and burn off the straw, in order to destroy the "chinch," and prevent it from depositing its eggs for another year. The young insect is of a vermilion color when first excluded from the egg, according to the description of Dr. Le Baron, of Illinois, but as it grows older, it becomes darker in color and finally quite black. No remedy has yet been discovered to prevent the invasion of these insects, that would not also destroy the crops which they infest. They flourish and multiply rapidly in dry weather, but in wet weather many of them are destroyed, and sometimes their career is entirely arrested by the advent of a cold continuous period of rain. If it were practicable to apply artificial showers to such vast wheat fields as are sometimes cultivated on the western prairies, the "water cure" might be suggestive, but except to a very limited extent, this could not be accomplished. At the end of the season the eggs are supposed to be deposited in the ground, where they remain until the next season, before they hatch; but, like most hemipterous insects, it is probable that the females at least, hybernate during the winter, and come forth and deposit their eggs upon the wheat crop in the spring. With this insect I must conclude this part of my subject, and proceed to illustrate the habits and characters of some species of the same *order*, that do not feed on vegetation, but who, on the contrary, lie in wait for other insects, and destroy them by sucking out their vital substance.

Between the preceding and the following hemipterous insects there is a very marked distinction, both in their habits and their peculiar organization. Whilst the former were exclusively plant sucking insects, the latter are animal sucking—that is, they seize other insects and suck out the animal juices which they contain, and upon this these predaceous kinds entirely subsist. For that purpose they may often be seen walking slowly and stealthily over the surface of vegetation, turning their heads from one side to the other in search of prey, and when it is discovered, they pounce upon it rather remorselessly, and soon give it its quietus, by piercing it and sucking its juices.

The largest and best known species of this latter kind of insects in this locality, is the *Prionotus Nonenareus*, illustrated by fig. 37. When fully grown this insect is often found from one inch and a quarter to one inch and a half in length, and of a uniform dark brown color. The under side of the abdomen is keeled, the upper side concaved, the lateral margins raised higher than the wings and wing-covers, which lie flat in the cavity thus formed; the thorax on the top is raised up longitudinally in a central ridge, and is notched or toothed, presenting the appearance of the arc of a circular saw above a plain. The head is proportionately small, the neck long, and the *proboscis* or sucker, and the *antenua* prominent. The legs are all long and moderately slender, the anterior pair being rather the longest and stoutest; these legs are also used in walking—but while the insect is in a state of repose or watching for its prey, they are usually projected to the front and elevated. The eyes are prominent and well developed, giving the insect a proportionate power of vision. Common throughout the southern part of Pennsylvania and the bordering states, as well as further west, south-west and south. Caterpillars, moths, butterflies, young grasshoppers and other insects, especially the two-winged flies, fall a prey, by turns, to the vigilance of these insects. They may, therefore, be properly regarded as objects of human protection, in our dealings with the insect world.

Similar in form and color, but not so large as the last described insect, is *Reduvius Raptor*, (fig. 38.) This insect rarely exceeds half an inch in length, and the abdomen is not keeled beneath. The lateral edges turn up somewhat as in the former species, but the thorax is not longitudinally ridged in the centre; it is, however, very rough above, and has a very deep transverse indentation in the middle. The head and neck are also very rough, and on the top, between the eyes and the base of the *antennæ*, are six short spurs or teeth, arranged in two's, and pointing forwards. The intermediate and posterior legs are slender, but the posterior pair are robust especially the femeral sections, which are also slightly toothed beneath, the tibial sections closing upon them like the blade of a pocket knife. The *antennæ*, as in the former species, (37,) are geniculated, or elbowed, and project out in front.

These insects are very useful and domestic in their habits, frequenting gardens, perching themselves upon the leaves of flowering plants, where they devour, indiscriminately, all aphids, flies, small moths, or any other small insect that may come in their way. To assure myself that these insects are really predaceous, I have watched them for hours, on plants, not a yard from my kitchen door, and have on many occasions observed them seize other insects, and suck out the entire liquid contents of their bodies, in an incredible short space of time, for that purpose, making one perforation after another in rapid succession, until the carcases were entirely depleted of their juices, when they would toss them overboard and watch for more.

The same raptorial structure of the anterior legs of figs. 37 and 38, are visible in fig. 39. *Mydocha viridis*, a slenderer allied species. This insect is about of the same length as the last described, but not so broad; the legs are longer and slenderer, and the color is usually a yellowish green; in some specimens, becoming a light mahogany brown above, and greenish beneath. Not so common on domestic vegetation as the former species, but still not so rare as formerly. It is to be remarked that, as wild trees, shrubbery, and plants—the haunts of certain insects—are removed, and the ground brought under cultivation, many of those insects infest domestic vegetation, because those haunts, which were also protections for various species of birds which destroyed many of the insects, being now removed, the birds have been removed with them, and therefore the insects would run entirely riot, and have matters their own way, if it were not that numerous parasites and predaceous insects are attracted to the scenes and localities of the depredators in quest of prey, and thus in a measure assist in keeping them in equilibrio. Of this character are the three foregoing raptorial species of *Hemipterous* insects, the last one named, fig. 39, being much quicker in its movements than the two former. I have frequently observed this insect pursue other insects on the wing, and invariably succeed in capturing them. They are especially destructive to moths and a species of red wood-boring beetle, (*tetraopes tomator*,) usually in large numbers upon the wild cotton. Fig. 40, *Mydocha petiolata*, a small, nearly black species, with light legs, about three-eighths of an inch in length, and with stout, spined, anterior legs, is usually found beneath stones or some other cover, performing the same office there, in a small way, that their cogeners do in open day. These little insects also hybernate during winter, and are on hand in the spring, ready to thwart our early insect enemies.

A very common predaceous *bug*, is a black species belonging to this family, fig. 41. *Pirates picipes*, the "pirate-bug." This insect is five-eighths of an inch in length and of a uniform dull black color. The thorax has a deeply indented transverse line in the middle, dividing it distinctly in two, and there is a longitudinal indentation in the middle of the anterior portion of the thorax. The legs are not proportionately so long as the four immediately preceding species, nor is the neck so slender and elongated. The anterior feet have a raptorial structure and the antennæ are capable of being bent over like an elbow. The *rostrum* or sucker is rather short, but more robust than any of the former species described. The female is somewhat larger than the male, and the wings in some species are entirely wanting in the female, or are merely rudimental. It is usually found under stones, wood or timbers, and may be seen at almost any season of the year in such places, either in their early immature stages, or in their medial and perfect states. I have frequently witnessed their operations in their attacks and destruction of other insects, and from experience have tested the power and virulence of their proboscal sting or perforations.

Some of these predaceous *Hemiptera* are aquatic in their habits, and may be found in ponds or streams in their perfect and imperfect stages; where they capture and destroy numbers of other noxious or annoying larva that make their abode therein. Fig. 42. *Nepa apiculata*, is one of these insects, being nearly three-quarters of an inch in length and of a uniform swarthy black color. The head, neck and thorax are very short, and the anterior legs very long and raptorial—formed and held in a position similar to those of the "preying mantis." The figure itself is an ample illustration of this insect, and may be sufficient to impress its form upon the mind of the common observer.

There are numerous other species, both terrestrial and equatic, belonging to this division of the order *Hemiptera*, that are of predatory habits, though all do not confine themselves to the destruction of other insects; but those which have been figured and briefly described, may convey a tolerable distinct idea of the whole of them, if particular and careful attention is paid to their *structure* and *forms*. The somewhat notorious "bed bug," *Cimex lectularius*, is a member of this family of the Hemipterans. A description or illustration of this insect is unnecessary here, the insect being more extensively and *un*popularly known perhaps than any other individual belonging to the class *insecta*. Although never attacking vegetation, yet they are most blood-thirsty in their attacks on man, laying in wait for him by introducing themselves in the cracks and crevices of old bedsteads or in the chinks of the wall. It is often a matter of astonishment how long they may subsist without food, considering their exceeding rapacity when food is accessible. Chambers, or even small houses in which this insect had become domicilated, have been deserted for two or three years, and almost immediately upon their re-occupancy, the *bed bugs* have returned almost as numerous, and more hungry than ever. Various remedies have been proposed and recommended for the destruction of these insects, and would be, doubtless, equally beneficial, if applied to other noxious individuals of this order. Corosive sublimate dissolved in alcohol, spirits of turpentine or "Costar's" roach, rat and bug bane, if properly and timely applied, will go far towards exterminating the race of bugs of various kinds. With these suggestion, I conclude this part of the subject, and devote the remainder of my remarks to the consideration of some of the homopterous *Hemiptera.*

The *heimptera homoptera* embrace those insects passing under the common names of "seventeen year locusts," or "harvest flies," "tree hoppers," "plant lice" and "bark lice," &c. They have not the coriaceous or leathery upper wings or wing covers, of the first division, nor yet the uniform triangular piece called the *scutum* or *scutellum*, on the middle of the back, and attached by its base to the base of the thorax. The wings are all of equal consistency and transparent throughout, ramified by numerous nervures, and instead of lying flat upon the back they are *deflexed*, or cover the hind body like the double roof of a house. The head in some species is very short and broad, being as wide as the thorax, and the antennæ also a mere *seta* or hair attached to a short basal joint. Although the *genera* and *families* are not large, yet in some of them the species are very numerous, and the destruction that sometimes follow their visits to the domain of vegetable nature, is very fearful indeed. So vast are their numbers, so widely are they spread, and so prolifically constituted withal, that it seems almost an impossibility to exterminate them by any ordinary means, from the great difficulty of applying remedies that would reach them. There are, however, numerous checks and counterbalances in the economy of nature itself, which render important aid in the diminishing or destruction of these insects.

Although those may be among the *most* efficient remedies against the depredations or increase of these insects, yet artificial remedies must also be resorted to, when it becomes apparent that they can be safely and effectively applied. The difficulty of applying remedies to the destruction of some of these insects, lies in the fact that the larva state of those is passed under ground and out of view; but, happily, these cases are not very numerous, nor by any means are they at all of the worst quality and character.

Prominently, and at the head of this divison of the order hemiptera, or rather the homopterous hemiptera, are the *Cicadiadæ*, or cicadans, which includes several species that have received, wrongly, the common names of "summer locust," "seventeen year locust," &c., but to which the term "*locust*" for many reasons cannot, with the most remote propriety, apply.

Species of this family are found in nearly every part of the world, and no where are they known or designated by any title that has the least approximation in thought and meaning to that of "locust."

The seventeen year *cicadans* do not appear uniformly the same season throughout the whole United States every seventeen years. In some localities they appear three, four, or five years earlier or later than they do in other localities, but it is pretty well established that full seventeen years intervenes respectively between their appearing. My earliest recollection of the visits of this insect is that of 1817, when their numbers were immense in the southern part of Pennsylvania, where I resided. Although I was a boy of but six years old, yet so numerous were they that I gathered scores of them and put them in my hat, which I wore upon my head, and in that manner carried them home, without having sustained the least injury from them. I deem it of importance to record this fact here, not that it would be impossible for a *cicadan* to inflict a wound, either with its *proboscis* or the knife-like *ovipositor* of the female, but simply because they do not offensively or defensively inflict a wound, even where they have ample opportunities to do so. I believe no well authenticated case is on record of any person having been stung and seriously injured by one of these insects.

The second visit of the seventeen year *cicadans*, in my time, was in the summer of 1834, when I first obtained specimens of the mature insect and the *pupæ*. Their third advent was in 1851, when I also obtained specimens of *pupæ* and *imago*, and their fourth visit, when I made new observations, was in the year 1868. There was a marked uniformity in their size, color and form, and therefore the superstitious ideas that they have sometimes the letter "W" on their wings, which is an omen of *war*, and that they sing "Pharaoh," which is an indication of *famine*, have no existence save in the disordered brains of the illiterate and the uninformed. It is exceedingly doubtful whether they partake of the least particle of sustenance of any kind, during their brief advent, which, under any circumstances, seldom continues more than two or three weeks. Therefore, the male insect is altogether incapable of injuring anything, and all the injury the female does, is in perforating the smaller branches of fruit, forest and ornamental trees, into which she deposits her eggs. Having witnessed the process of oviposition, I feel confident that the female cannot deposit her eggs in the trunk or any of the larger limbs of a tree, because, if she cannot embrace the branch with her feet, she cannot obtain the necessary purchase or lever power to make the necessary incision in the branch to receive the eggs.

These small branches generally break off where they were perforated, and after some time fall to the ground; but if the tree should be in need of that kind of pruning, designated "heading-in," the work of the cicadans may be a benefit to the tree rather than a positive injury. The long period that intervenes between the deposition of the eggs and the maturity of the insect, and its short continuance in its mature state, makes the cicadan one of the "plagues" of vegetation that is least to be dreaded *above* ground, but *under* ground they may, possibly, not be so harmless. There are many, however, that must become food for ground-moles, mice, and the predaceous insects that burrow under ground; certain it is, that of all the great number of eggs that are deposited, not more than one in ten develops a perfect and mature cicadan.

Fig. 43 is an illustration of *Cicada septendecim*, or "seventeen-year cicadan," taken in the month of June, 1851, near Lancaster, Pa. Fig. 44 is a *pupa*, taken at the same time and place, ready to break the pupal shell and issue forth. Fig. 45 is a *pupa*, taken earlier in the season. In both of these specimens the rudimentary wings are present, and also the largely developed anterior feet, to assist the insect in its burrowing progress through the earth. Fig. 46 is a *larva* in its eighth or ninth year. It does not differ materially from the *pupa*, except that it lacks the rudimental wings, is smaller, and lighter colored. In about six or seven weeks after the eggs are deposited, the young cicadan is excluded therefrom, and then is no larger than a common ant, of a whitish color, and having a general resemblance to fig. 46. These young immediately run down the trunk of the tree, or drop down to the ground, and commence burrowing into the earth, assisted by their proportionately large and peculiarly formed anterior feet. They do not go very deep into the earth, not below the roots of trees and shrubbery, although the popular notion is, that it takes them eight and a half years to go down to their accustomed depth, and then the same length of time to come up again. When the young enters the ground it follows the roots of plants and trees, and fixes itself upon the most tender of them, where it remains—probably shifting its position at intervals, when the sap becomes exhausted. In this manner they have been frequently found, and have been known to be injurious to trees, in some instances causing succeeding failures in the crop of fruit. The changes they undergo, except an increase in size, are very slight; principally the development of the rudimental wings. In May and June, of their seventeenth larval and pupal year, by the aid of their powerful, mole-like front feet, they burrow out of the earth, and climb up any branch, weed or other object, of which they can seize a hold, where, after a short period a longitudinal slit is effected down the middle of the head and thorax, above, by a contortion of the insect inside of the pupa case, through which it proceeds to emerge, a perfectly formed and mature *Cicada*. The color is a dark brown or black, above; the wings are transparent, and the nervures, the feet and the underside of the abdomen are an orange red. The eyes are very prominent; the *antennæ* are short and awl shaped, and the body measures about one inch and a quarter in length.

In England these insects are called "*Harvest-flies*," a name preferable and more appropriate than "*Locust*," and, with the prefix of an adjective, when a particular species is referred to, might be applied to all our species. It would, however, cause less confusion, if all our people, high and low, learned and unlearned, would accustom themselves to call it by its correct Latin name at once. *Cicada* is no harder to pronounce than any other name that has been applied to these insects.

We have in Pennsylvania a larger species of *Cicada* than the foregoing, which has been named the "Dog-day harvest-fly" by Dr. Harris, because this species is usually most abundant during the dog-days, or makes its advent about that period in the summer. This insect is illustrated by fig. 47, *Cicada pruinosa*, or frosted harvest-fly. It measures one inch and a half from the front of the head to the end of the abdomen, and about two inches to the tips of the wings. The coloring is variable, black predominating above and a mealy or chalky-white beneath. The base and the basal portion of the nervures of the wings are green. The eyes and feet are greenish, and a green collar, with transverse black markings, bounds the anterior portion of the thorax. From the uniformity of the appearance of these insects every summer, about the fifteenth of July, the inference is that they complete all their changes within a single year. This species is also known in the eastern and western States, and perhaps throughout out our entire country. The male makes a singular shrill drumming noise, commencing feebly at first, increasing gradually in intensity, and then diminishing again until it becomes entirely silent. This noise is produced by two large scale-like appendages beneath the abdomen, and the sound is very familiar, and often imitated by boys looping a horse-hair around the end of a stick, the other ends terminating in a small drum-head, and turning or swinging it around in a rotary motion. The larva and pupa of these insects also undergo their transformations under ground, and with the exceptions of the length of their larval periods, are similar to the seventeen year *cicada*. Without knowing precisely the extent of the injury done to vegetation by these insects, yet they may be safely classed with the *injurious* kinds. Fig. 48, Larva of *C. pruinosa*. There is a larger family of insects belonging to this division of the order, which are usually denominated "tree-hoppers," "frog-hoppers," "leaf-hoppers," &c., but they differ greatly in form and structure, from the foregoing, and also from each other. These insects are included in the family *Membracidæ*, membracians, by naturalists, which means sharp-edged, from the sharp edges and angles which characterize their forms. A common species of these tree-hoppers in this locality is that of fig. 49. *Thelia bimaculata*, which is found in great abundance, some seasons, upon the locust tree. This insect measures about half an inch in length from the end of the thoracic horn in front, to the end of the projecting thoracic point behind. The color is a brownish, with a lateral oblong yellowish spot on each side, and the same color, in maculations in front. The head is much drawn under the thorax in front, and is not visible from above. The female is without the horn, and is of a uniform, ashen or brownish color. Dr. Harris supposed that these insects undergo their transformations, or at least pass a part of their larval period under ground, but, as I have found the immature specimens of this and alliod species upon vegetation, it is possible they may not go into the ground at all, after exclusion from the eggs, but be gradually developed, like the young grasshoppers. They usually sit close to the bark of the young locust trees, and then appear much like the natural thorn of the tree, and in that respect, perhaps, "thorn-hopper" would be a good common name to distinguish them from others of the same family. They injure trees and vegetation by perforations and depriving it of its sap.

Ceresa diceros, fig. 50, is another common tree-hopper in this locality, and usually found under nearly the same circumstances as the former one. It is about a quarter of an inch in length, and of a light brown color, with yellowish maculations on top. The thorax is drawn out in two points at the sides and sharply ridged behind, forming, to look down upon it, the outline of the letter T. The head, as in the former species, is also invisible from above. Its habits are also very similar, but as the young are so seldom seen there is some doubt as to where they pass the larger portion of their larval period. *Larvalogy* is comparatively in its infant state yet in this country, there being not nearly so much known upon that subject by entomologists as the demands of science, of horticulture and agriculture require.

The *most* common species of these tree-hoppers, however, is the *Ceresa bubalus*, illustrated by fig. 51. Its size and shape are very similar to fig. 50, but its color is a uniform green, and it is found on a greater variety of trees and plants than the species alluded to immediately before it. It also has a wider range of country for its habitation, having been found in most of the States of the Union. Being of a grass-green, it, through this vegetable resemblance, escapes, no doubt, the snares of many of its natural enemies. Part of the larval period is supposed to be passed under ground, as they are seldom found on vegetation in their earlier stages, but are first observed to be matured or nearly matured specimens. Very abundant sometimes in July and August.

The three species illustrated and briefly described are, however, *types* of a tolerable large family, most of which must pass their larva state in little cavities underground, feeding upon the juices of the roots of vegetation, as I have frequently found the young of these and other allied insects under similar circumstances. As to a remedy, whilst they are in the larva state, it would be almost impossible to effectually apply one if it were known. In the *perfect* state they adhere closely to the limbs of the trees whereon they are found, remaining stationary for hours together, and only leap or fly when disturbed, during which time they are engaged in puncturing the trees to extract their juices or making incisions with their ovipositors to accommodate their eggs.

Various species of vegetation, including the domestic and wild grape vines, are more or less infested with, and suffer from the attacks of a number of small species of homopterous insects, called "frog-hoppers," "cuckoo-spits," or "froth-hoppers," &c. There are many species of these, and sometimes the numbers of certain species are immense, entirely destroying the vitality of the foliage of grape vines and other species of vegetation. Some of these insects are, however, usually only found on succulent plants, and where they are numerous, their attacks have a damaging influence.

A very common species is fig. 52, *Tettigonia coccinea.* This insect, which is not the most destructive species, is yet the representative of a very destructive group, which can only be treated of in detail, in a special article on that family or group of insects. It is from ten to twelve lines in length, and is of a yellowish color beneath, and on the upper side of the head. From the eyes around the front margin of the head, is a narrow brownish line, and the thorax is red, with a dark olive green centre; the wing covers are also longitudinally striped with dark olive green and vermillion. The insect is a very pretty one, and is an expert leaper, being assisted in this operation by its wings, which, when fully developed, enable it to make considerable of a flight, the air sometimes towards autumn becoming literally filled with them. There are probably some forty species belonging to this *genus*, and the allied genera of *Jassus*, *Cercopis*, *Diedrocephela*, &c., all of them being similar in their habits and form, but differing in color and size. The *Tettigonia Vitis*, much resembling the last named species, (fig. 53,) is particularly partial to the domestic and foreign grape vines, and is usually found on the underside of the leaf, during the greater part of the summer, for they pass through their several transformations or changes on the vines. They may be first observed about the beginning of June, and are then quite small and without wings. Great numbers of their empty skins, which they have cast off, may usually be found adhering to the leaves they inhabit, for they pass through several moultings during the season.

If these insects are permitted to continue unmolested during the entire season upon the grape vines, sucking out their juices, they become much depleted, the leaves turn yellow in midsummer, and prematurely put on the aspect of autumn, and of course the fruit does not fill and ripen healthily, but is doomed to an early decay and fall. At the approach of autumn and when the leaves begin to fall, these insects hide among tufts of grass, leaves, roots, and other appropriate places, where they hybernate during the winter, and make their appearance again the following spring, when they deposit their eggs upon the grape vines, where, after the young are hatched, they go through the same process that their progenitors did. "Fumigations with tobacco beneath a movable tent, placed over the trellis of the vines," has been said to answer the purpose completely as a remedy for the destruction of this insect. This operation requires great skill and care to effect the desired end, for there is a great proneness on the part of these insects to disperse and scamper off in different directions. A better remedy, however, ought to be discovered, and no doubt that time and experience will develop such a remedy in localities where the vines suffer from the attacks of these and kindred species of insects.

The history of one or two of the species, is the history of nearly all that belong to the *families Cercopididæ* and *Tettigoniadæ*, for their habits approximate as nearly to each other as do their forms, and consequently the remedies that may obtain against one species would doubtless be as effective against any other species or perhaps all of them. They do not all, however, attack the grape vines, but many other species of vegetation are subject also to the attacks of one or more of them. Being essentially "sapsucking" in their feeding habits, it becomes very apparent that these homopterous tribes are unmistakably noxious. And this may also be said of this entire division of the order to which these insects belong. Unlike those *orders* and *sub-orders* heretofore described, there is no distinct redeeming tribe or family among them that may be called *predaceous* or "insect friends."

Of all the pestilential enemies that vegetation is heir to, there perhaps are none more numerous and more injurious than the *Aphididæ* or "plant lice." This *family* now embraces a great many *genera*, and a still larger number of *species*, almost every weed, plant, shrub or tree having a species peculiar to it. Some of these species are omniverous and may therefore be found on a variety of plants. The *Aphis rosea* is usually found upon roses, a small greenish species known to floriculturists in general; the *Aphis brassicæ*, found in great numbers on kale and cabbage, differing very little from the first named species; the *Aphis persicæ* not only attacks the leaves of the peach tree, but for the past two or three seasons I have observed them in numbers within the *calyx*, with their beaks buried in the embryo peach, causing it to fall prematurely and shrivel up; the *Aphis caryæ* is found on hickory trees, especially the "pig-nut" hickory. Its body is covered with a substance resembling the bloom of the plum, the top of the *thorax* and veins of the wings are black, and they have four rows of little transverse spots on the back. The *Aphis salicicola*, a small black species with a spotted body, infests the willow. There are also species of *Aphis* that attack the roots of plants, and I have frequently found the roots of the China-aster infested with thousands of them, effecting the death of the plant before the *cause* can be discovered. These are supposed to be identical with the European species, the *Aphis radicis*, a small white insect represented by fig. 54—*a*, the ventral view; *b*, the dorsal view; *c*, the piercer or tube; and *d*, the *antennæ*; showing their peculiar form. These insects also attack the roots of other plants, and when they occur in great numbers, they nearly always prove a certain destruction to them. The first manifestations of decay will be in the pale green or yellowish green color of the leaves, after which they begin to wilt, and if the roots are then examined, they will be found full of these minute insects, in some cases the main stem being nearly severed by the great multitude of the punctures which they make.

The general history of the family *Aphidida* is somewhat peculiar, differing in the manner of their procreation very materially from nearly all other insects known to natural science. The first brood of the season are *viviporous* females, and all the generations which follow them during the subsequent parts of the season are of the same sex and character. The female *aphid* brings forth her young alive, and after a short period—only a day or two—*they* also bring forth female aphids, and thus they go on to the end of the season, without the intervention of a male insect. When the summer season, and with it, all the succulent vegetation has become dried up, and the leaves of the trees have fallen, a male brood is brought forth, and after the fertilization of the female, she deposits her eggs and both sexes die. Sometimes they continue feeding and procreating until late in the fall; the first of December, when the weather continues mild, finding them still on the tender twigs of some trees. Indeed this late brood of males and the fecundation of the female at the end of the season, appears only to be a special arrangement for the perpetuation of the species during the cold and inclement winter months, for it has been demonstrated both in Europe and America, that when plants infested with these insects have been removed to the warm green house before the frosts and freezes of winter have set in, that they continue re-producing during the whole winter, as they had previously done during the summer, without re-fecundation, or even the *production* of the male insect at all; thus producing not only from nine to fourteen generations, without the fertilizing aid of the male, but even up to the thirtieth generation when kept in a warm room, whilst the same species pursue a different economy just outside of its walls. It becomes apparent from these peculiar characteristics of the *aphid* tribe, that they are capable of a multitudiuous increase in a comparatively short time, and that consequently the injuries which vegetation sustains from their attacks, are almost incalculable as to time and extent.

The most serious visitation of aphids in this country was by that species which, for the past ten years, and especially during the summer of 1862, had attacked the wheat and oat crop of Pennsylvania and the adjacent States, and which proved to be so injurious to the latter crop. A dealer in oats and hay of a wide experience informed me, within the past month, that all the purchases he had made during the war, for government purposes and otherwise, had been based on weight, and not on bulk. The ordinary average of oats in other seasons was about thirty-five pounds to the bushel, but that the oats of 1862 did not average more than seventeen pounds to the bushel, and some of it was as low as fifteen pounds to the bushel. This depletion was caused by the oat aphids, which were seen in such countless numbers in nearly all of the oat fields in Eastern Pennsylvania, and especially in Lancaster county. The damage done to the crop in this region was more than one hundred per centum. These ravages of this insect were not confined to a single county, but were extended over a wide range of country, including many of the States. The wheat crop, ripening before the aphids became so numerous as they were found on the oats, made comparatively a fortunate escape. From the vast numbers of these insects prevailing during that season, Pennsylvania must have suffered, from this cause alone, nearly as much as her tax would amount to in one year in support of the war. The history of this insect had been known in special localities in this country for at least forty years, and it is supposed, like the Hessian fly, to have been imported in the egg state, in straw, from Europe, where it has done considerable damage to the cereal crops. A minute description of one of these insects is but a description of nearly all of them, except their color, size and the neurations of their wings.

Fig. 55, *a*, *b*, *c* and *d*, (*aphis avœna,*) are illustrations of the oat louse, or oat *aphis*. As long as they feed upon the juices of the stalk, before the grain appears, these insects are uniformly green in color; but after they have left the lower portion of the stalk and have fastened themselves about the base of the grain, their color changes, and they finally turn to a brick red, and in that character give a red tint to whole fields of wheat, oats, or any other vegetable substance upon which they may subsist. The mode of procreation of aphids in general has been stated as being by eggs in the first generation, but that subsequently they produce their young alive, thus becoming *viviperous*, until the end of the season, when they become *oviperous* again, a brood of males coming forth, fertilizing the females, who then deposit their eggs, and then both sexes die; but, according to Dr. Fitch's observations, this species continues on during the whole winter, re-producing living aphids without the intervention of a male, and is only arrested in this process by the freezing cold, and that as soon as warm thawing weather returns the insects revive again, and continue the work of re-production as if no interruption had taken place. This is somewhat singular in regard to this insect, and makes it differ in its economies widely from most other species of aphis, although I have known some of them to continue the work of re-production, out in the open air, as late as the month of December, and others to continue all winter in the same work when upon plants that have been removed to a warm room or a warm green-house.

The application of a remedy to destroy the oat-aphis would, from the nature of the case, be impracticable without involving the entire destruction of the straw and grain along with the aphis; but where plants, trees, shrubbery and garden vegetables are infested, dusting them with finely pulverized lime, after a natural or artificial shower, has been found a good remedy. If this course is pursued in winter, on branches where the eggs have been deposited, it would effectually destroy them. The lime should be first slaked, otherwise the heat which it evolves in undergoing the chemical change called *slaking*, would burn the leaves and tender branches, and whilest it might only the more effectively destroy the insect, would also damage or destroy the trees or plants. But there are a number of *natural* enemies of the aphids, which destroy millions of them every day. Among these are storms, rains and winds; birds, spiders, toads, tree-frogs, lady-birds, lace-wings or hemerobians, syrphus-flies, ichneumons, and numerous others not visible to the unassisted vision of man.

It has not been clearly demonstrated yet what becomes of the *aphis avuna* after the different grains and grasses upon which it feeds become dry and ripened, and lose their nourishing moisture. Other species of *aphis*, as the apple, pear, peach or rose aphis, &c., deposit their eggs on the tender branches of the trees they inhabit, late in autumn, and before the falling of the leaves, where they remain until the following spring, when they are hatched by the warm sun, and the young brood makes its appearance just in time to make a savory repast upon the juices of the tender leaves. But where the oat-aphis deposits her eggs is not so clear. It appears, however, that the eggs are deposited upon the young grain in the fall as soon as it is up, if deposited at all, and that during the time intervening between the ripening of the grain and the appearance of the young new crop, such of the aphids as survive feed upon other species of vegetation, and only resort to the grain again when the other becomes exhausted of its nourishing fluid. It seems fortunate for mankind that these enemies of vegetation are so tender and so easily destroyed. During the summer of 1862 I noticed that in numberless instances the spiders spun webs between the fence rails, forming a sort of continuous seine or net, in which millions upon millions of the winged aphids were caught and perished, an easy prey.

In addition to the former artificial remedies suggested for the destruction of aphids, tobacco and sulphur fumigations are recommended if carefully applied, and also drenchings of lye and tobacco juice. Mr. A. G. Hanford, in the XIIIth volume of the Michigan Farmer, recommends trees infested with the bark louse to be painted over with a mixture of tar and linseed oil, beat together and applied warm. When dry, this cracks and peels off, carrying the insects along with it. This, if applied in winter, would also be effectual in carrying off the eggs of aphids adhering to the branches, and thus prevent them from being hatched in the spring.

The number of species, as before remarked, belonging to the Aphid family, now known *to*, and described *by*, naturalists, is very large, and these have been divided into different *genera* and groups, almost every species of vegetation being infested with an insect peculiar to itself, although the same species is often found on various kinds of plants. Whatever remedies may be discovered for their destruction or prevention, will perhaps be as applicable to one species as to another, and, therefore, in discussing their general history and habits, and the best means to guard against the injuries they are capable of inflicting upon vegetation, it is not necessary to go into a scientific detail as to description and proper arrangement, because this is not the kind of knowledge that is most essential to those who are most injured by their presence. The figures 54 and 55, a, b, c and d, will amply illustrate their *forms* and general appearance, and the manner in which the wings are held when flying or in a state of repose. The two short tubes at the end, or near the anal segment of the abdomen, are called the "honey-tubes," because there is constantly a small quantity of honey, or sweet liquid, oozing out of them, which drops upon the leaves they inhabit, which is known under the name of "honey-dew." This honey-dew is eagerly sought by ants, wasps, hornets, flies and various other *hymenopterous* and *dipterous* species of insects, but there are perhaps none that are more assiduous in their attentions to the aphids than the ants. The different sizes of the aphids, when congregated together, are indications of their different ages, and whether they be winged or unwinged (except near the end of the season) they are usually all females, the wings no doubt being vouchsafed in order to facilitate their migration to other localities, when the first one becomes too thickly inhabited for the nutriment it furnishes. The unwinged females are generally the most prolific, sometimes two to one.

Another family of homopterous insects, allied to the aphids in the *form* of the males, and in many of their habits, are the *Coccidæ*, called in common language "scale insects," "scab lice," wood lice," &c. These differ from the aphids, in the females being stationary, never leaving the spot where they first fasten themselves to the stem or branch of a tree or shrub, and assuming the form of a scale, an oyster shell or a shield, and covering their eggs with their bodies, or by a downy substance exuding therefrom. These insects, so far at least as concerns the females, are seldom found on the leaves of trees, but on the trunk or branches. The males become winged, but instead of four wings like the aphids, they generally have but two, and these are not deflexed or do not meet together like a gothic roof, but they lie flat upon the back when in repose. The antennæ are long like in the male aphid, and they have two long filiments attached to the last or terminal segment of the abdomen; whereas the tubes of the aphids are short and obtuse, and some distance from the terminal segment. They differ also from the aphids in their system of re-production, bringing their young forth all from eggs, but so far as I could perceive only one brood in a season, but that brood so numerous as to make the insect as destructive to trees as the aphids could possibly be; in one instance where I counted, there being at least fifteen thousand of these young insects hatched from eggs, on a branch of silver maple not more than a foot in length and no thicker than a common penholder. Of course millions of these tiny, delicate insects were doomed to a premature destruction, without having had an opportunity of doing any injury to trees or any other vegetation, but sufficient of them usually survive to continue the species, and found the elements of a new colony that survives the winter, to ultimate its destructive qualities on the return of another summer season.

An insect belonging to this family was very destructive to the rose bushes in some parts of Lancaster county two or three years ago, and I have also heard of it being in Virginia, New York and some of the eastern States, so that it probably is widely known. It fixes itself upon the main trunk and the branches, and in a short time the stems are entirely covered with whitish mouldy-like scales, which, in the course of one or two years destroys the bush entirely, leaving it as light and spongy as cork. The female appears as a small, roundish, flattened scale or shield, in which there are no limbs visible, and adheres to the bark by the proboscis or sucker; and the male is a quite small, pink colored insect, of the *coccus* form, not more than half a line in length. Our insect is probably the same as that of Europe—the *Aspidiotus rosea* of authors. This insect does probably not confine itself to the rose; at least on one occasion I observed that it extended its dominion to several other species of shrubbery, after it had destroyed the rose; but then it gradually died out of its own accord. Where valuable shrubbery are attacked by this insect they should be carefully brushed off with a stiff brush, made in pencil form for that purpose, first spreading paper or a cloth upon the ground, under the plants, to receive them, otherwise they might find their way up to their old places again, unless the females should be so far advanced as not to be able to travel, and the males all dead. This brushing ought to be done early in the spring, before the eggs are hatched, and before the rose bushes sprout, otherwise the young buds would be injured by the operation. Any mixture of a sticky nature, that would harden and peel off in scales, would also carry these *scale* insects with it. If any of the eggs should remain they might be destroyed by an application of some alkalinous substance—common lye, whale oil soap, or oil.

Fig. 56 a. is an illustration of the *coccus cacti*, or cochineal insect, and is merely introduced here to exhibit the general *form;* the insects of this family being so small and tender that they readily dry up and become exceedingly fragile, and are consequently easily lost. 56 d. is the natural size; 56 b. is the female, showing the underside and the very short feet by which she adheres to the plant. It is estimated that there are 70,000 insects in a pound of cochineal, and that 800,000 pounds are annually imported by Europe alone, from which some idea may be formed of the prolific character of these insects. This may also suggest the propriety of directing inquiry in such a way as may lead to the discovery of the uses to which our native species may be put, in manufactures or in the "arts and sciences." 56 c. exhibits the upper side of the female, and strongly resembles several species of these insects found upon fruit trees in the United States, especially the apple and peach as well as the pear.

Fig. 57 a. is the "mealy coccus," so destructive to the different kinds of plants in the green-house. Mr. John Zimmerman, of Lancaster city, who has for years been engaged in floriculture, alleges that this insect is the greatest enemy to hot-house plants that he has to contend with, and the more so because it attacks the leaves, which curl up and makes it difficult to apply an extinguishing remedy against them. The insects are numerous, very small, not more than two lines in length, and are covered over with a white mealy or scaley substance, secreting also a flocky or downy substance, in which are deposited the eggs. The insect is doubtless the *coccus adonidum* of Europe, and must have been imported into this country with foreign plants. 57 b. is an immatured specimen of the male species, in which the marginal filaments are not yet developed. The only way to expel these insects seems to be with the free use of a soft pencil brush, and then destroying them effectually by other means.

Fig. 58, a, b and c, is the apple "bark louse," or scale insect, *Aspidiotus conchiformis*, sometimes also called the "oyster shell insect," from the scale resembling an oyster shell in form, hence also its trivial name. This insect does not confine itself to the apple tree, but is also found on the pear, the plum, the currant and other trees and shrubbery that are in proximity. It has an exceeding wide range of country as its habitation, probably all of northern, eastern and western States, or wherever the apple tree is cultivated. It prefers young trees, and these are sometimes literally covered with these insects, from the roots to the ends of the branches. Of course where this takes place the tree must eventually die if not relieved by artificial means, and where a large number of trees are infested these means are not very easily applied without involving a great amount of patient labor. Even when all the insects are removed by artificial means, the trees afterwards look unsightly and unhealthy, and often gradually decay and die. The scales, which are the dead bodies of the females, are about an eighth of an inch in length and shaped like an oyster shell, the females having died after the deposition of the eggs, and the dried up body remaining as a covering or shield-like protection. I have counted as high as fifty eggs under one of these female scales, but they contain usually less than that number—perhaps not more than half so many. The eggs hatch about the middle of May, or later, when the larva is a minute whitish insect, scarcely visible at first, to the naked eye, appearing like white dust upon the trees. They soon scatter all over the trees, but many of them must perish or fall a prey to other insects and birds, or perhaps by descending showers of rain. If scrubbing the trees with a saline or alkalinous wash, or the application of oil, is too much trouble and labor, it has been suggested that to fasten pieces of whale-oil soap in the forks of the branches, the gradually descending liquid, running down the branches as the soap dissolves, would eventually destroy all the *eggs*, *pupas* or *imagos* of these insects that might be upon the branches below the soap. The males acquire wings and are similar in form to fig. 56 a, but it is rarely that they are seen from their exceeding small size, and therefore they are best known from the female scale, and from the great damage done to the trees by them, and the whitened, scruffy condition of the bark.

Fig. 59 is a small, very convexed, tortoise-shaped bark louse, found on the peach trees in some parts of Pennsylvania, the past and present season. The color is a shining mahogany brown. No eggs were found under any of them, but they were found adhering to the surface of the young twigs, by the whole under side of the insect, and on removal, faint indications of feet and rostrum could be with difficulty perceived. This insect is about five lines in length, and nearly the same in width. Around each of them, and sometimes adhering to the margin, were a few mahogany or cinnamon brown eggs, but around the base of the buds, and in some cases along the one side of the branches, thousands upon thousands of these eggs were visible to the naked eye, looking like brownish-red powder, but under a microscope they had the shape and appearance of ripe persimmons, laid nicely out on a board to dry, being of nearly the shape and color of that fruit when properly ripe, and before they shrink and shrivel in form. As this insect differs in color and in habit from the common "peach bark louse," *Lecanium persicæ*, and as it approaches in form—even including the marginal, lateral and dorsal plates—to the common "land tortoise," *(Cistudæ clausa,)* I propose to name it, provisionally, *Lecanium cistudum.*

Figs. 60, a, b and c, are figures of the female and young bark louse of the linden and maple trees. This is the species to which I alluded in the present paper as occurring in such vast numbers, amounting to tens or perhaps hundreds of millions on a single tree. The female is about ten lines in length, but is not large enough to cover all her eggs, and therefore she secretes a mass of white, flocky or cottony substance, in which the eggs are deposited, and then she dies, but still adheres to the branch by the one end, the other end being raised to an angle of about forty-five degrees, by the mass of cotton and eggs. These female scales are usually arranged in a single or double line along the under side of the branches of the linden and maple trees, but they are also found similarly situated on other trees. 60, b and c, the young, a short time after they emerge from the egg. Some years ago, I gave a history of this insect in the columns of *Pennsylvania Farm Journal*, and named it *Coccus innumerabilis*, but it has been since referred to another *genus* and species, to which I have not present access.*

Thus I have briefly noticed a few of the insects that belong to one of the most destructive *orders* in the whole class *insecta*. A fuller notice was not practicable in an article of such a limited extent; moreover, the whole history of all the species belonging to this order would only involve a useless repetition that might not only be discouraging but also distasteful to the reader. The main object is to familiarize the husbandman with the different insect forms that he may encounter in his daily duties, sufficiently to enable him to distinguish between friends and foes. He will thus perceive that among *orthopterous* insects there is but a single friendly species, namely the *Mantis Carolina;* that among the *Hemiptera* there are several species, perhaps the whole *family Reduviadæ*, which includes the long necked raptorial species; but that among the *Homoptera*, so far as is certainly known, there is not a single one.

Even the friends, though few in number, it is as *necessary to know* as it is to know the *enemies*, although they may count by hundreds, or thousands, or tens of thousands. Some of the insects alluded to in these papers are found in nearly all of the States of the Union, and others are more local in their distribution; but these have, in many cases, an allied representative in other localities. Learning to recognize and distinguish between insects, the husbandman will then have advanced an important step in the direction necessary to discover their natural enemies, or to develop and apply those artificial means so essential to insure their destruction or defeat. In this connection I would suggest to farmers, gardeners and fruit growers to prove all things and hold fast that which is good. If they should through experience, through theorizing, or through accident, discover a *good* remedy to prevent the destruction caused by insects, no matter how much it may be opposed to the principles of *mere theorists* without experience, let them make a fair and intelligent trial of their discovery, and not be diverted from it by the sneers or disapprobation of the incredulous, or that class which are always afraid of believing too much.

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* *Lecanium acericola.*

LECTURE DELIVEREDAT HARRISBURG, SEPT. 29, 1869,

Before the Pennsylvania State Agricultural Society, on some cultivated PLANTS, *and the changes produced in them by cultivation, by* Dr. J. T. Rothrock, *Professor of Botany in the Agricultural College of Pennsylvania.*

Ordered to be published by the Society.

A. BOYD HAMILTON, *President.*

Ladies and Gentlemen:—I do not come before you to speak in the abstract of the dignity of labor. It has had its general principle eulogists from at least the time of Virgil down to the present day. This has all been done, and well done. I do propose, however, to introduce to you some of the results of labor; to show you that the fruits of the earth, by which we are now surrounded, were once as rude and undeveloped as the barbarian who made them minister to his simple animal engorgement; that with equal step, man and his vegetable surroundings have emerged from rough, tough, natural vigor, to the polish and tenderness of our yearly productions; that indeed the advance made by one, is a measure of the advance made by the other; that some of the grandest results of modern agriculture and horticulture, (particularly the latter,) are the legitimate results of that increased knowledge we call civilization. This I shall attempt to do, without stopping to ask your attention at every step to the parallelism existing, but by simply taking our vegetable productions, giving their history, and comparing them now with what they once were. The corresponding growth of humanity will be apparent to you from the commonest elements of history.

Let me here say, that so far from knowing best the plants longest under cultivation, we know them least well. Their redemption from wild nature stretches back to a time we call antiquity, about which gather all the clouds and darkness of dim uncertainty; when as yet men had never written their own origin in illuminated and illuminating text, mayhap before even *characters* represented sounds, and these *articulated* made words on parchment or Egyptian papyri. Leaving out of the question the dwellers in Eden, we reach a period when man, so far as we can learn, lived by the chase alone, or at most, derived his little vegetable food from nature's pure, unassisted spontaneity. He at least had no cultivated grains or fruits, if we may judge from the total absence of their remains among the relics of those tribes so primitive and so barbarous. We can discern neither agricultural implements, nor any evidences of farming tendencies.

On the coasts of Denmark are huge shell heaps made by the country's early inhabitants, and about them not a trace of any utilized vegetable, save the wood of the fires, has been discovered. These shell mounds date back to a time called the stone period, when no metal weapons of offence or defence seem to have been known. When the stone spears and arrow heads were devoid of even the polish and symmetry impressed upon them by our North American aborigines. In what is now known as Switzerland there have recently been found the remains of dwellings in the lakes. Indeed, Herodotus even refers to such found at other places. These were built with reference to the safety of their occupants. Men then were simply hunters, whose most legitimate game was man. Hence we find these lake dwellers had constructed large villages remote from shore. They placed deep in the miry lake bottoms their piles, and on them raised their dwellings, which were connected by means of a long bridge with the shore. Now we find in immediate proximity to these lake villages "the remains of burnt wheat, at least two kinds of barley, some flat, round cakes of bread, cloth which is supposed to be of flax that was plaited not woven." The inhabitants had even then domesticated the dog, the ox, the sheep and the goat. "Carbonized apples and pears of small size, such as still grow wild in the Swiss forests, stones of the wild plum, seeds of the raspberry and blackberry and beechnuts also occur in the mud, and hazelnuts in great plenty." This, though it seems to have been in a period somewhat later than that in which the Danish shell heaps were made, was yet so early that the hatchets were made of serpentine and greenstone, and the arrow heads of quartz. We might be safe in regarding them as memorials of a time as remote as the building of the pyramids of Egypt. Though of this we have no absolutely conclusive evidence. Distinguished authorities have used these relics, with those derived from the Danish shell heaps, as arguments in favor of an antiquity of the human race much exceeding six thousand years. As yet conservative *scientists* hesitate about adopting such views as sound theories, deduced from other and well established facts. Here let me remind you that the earliest signs of agriculture come to us from the east. Those who raised the pyramids were an agricultural people, deriving an annual tribute from the rich loam of the Nile valley, when our ancestors were the skin-clad Germans, dreaded even by the Roman legions, or infatuated worshippers offering human sacrifices in the Druid oak groves of England. The dawning rays of agricultural science come to us from the sunrise land. The most mature harvest and largest yield await our labor in this magnificent land of the setting sun. "*Ex oriente lux*, *ex occidente* *frux*." From the east light, from the west fruit. I would here add that the science which promises to do most for the cultivation of the soil, owes, if not its origin, at least one of its most notable impulses also to Egypt. Chemistry simply meant when the name was given, the art of the Black land; this was Egypt, the soil of which was black from the yearly contribution the overflowing Nile made to its surface. The word was synonymous with the black art; and from the chemist's laboratory the fumes indicative of the advancing science were associated by the vulgar with vapors and sulphurous gases, symbolic of a land darker even than Egypt. Her priests ruled in state, religion and science—of which geometry and chemistry or alchemy were the dominant branches.

Let us now turn to the modern period, and introduce the grains and fruits which grow around us. Here let me disclaim all originality, and frankly say I am indebted for most of my facts to those invaluable volumes of Dr. Darwin—The Variation of Animals and Plants Under Domestication. They are full of just what every intelligent farmer should know.

In speaking of the difficulties which gather around and beset the philosophic inquirer, in his attempts to reach definite ideas concerning the origin of our cultivated plants, he tells us: "Not a few botanists believe that several of our anciently cultivated plants have become so profoundly modified that it is not possible now to recognize the aboriginal parent-forms. Equally perplexing are the doubts whether some of them are descended from one species, or from several inextricably commingled by crossing and variation." The younger De Candolle publishes us a list of a hundred and fifty-seven of the most useful cultivated plants; eighty-five of these are almost certainly known in their wild state; forty he considers doubtful, and thirty-two are quite unknown. This list is perhaps as nearly correct as any we can accept.

From the above proportions, we are safe in concluding we can usually identify, *with more or less of certainty*, the parents of our cultivated plants.

For our purpose, it will be sufficiently accurate if we define the word *species* as the aggregate of existing individuals descended from one parent or pair of parents. This is open to grave thoretical objections, but for practical purposes it will answer.

Of wheat, we have recognized from four to seven original species; of rye, one; of barley, three; of oats, from two to four. We do not know *beyond doubt* the parentage of any of these cereal grains. The parent stock of the common wheat is possibly as certainly known as any. It seems to be now growing wild in Asia. Some years back it was thought that in a Mediterranean plant we had certainly found the parentage of our wheat. It is now known that this supposed ancestor was a hybrid between wheat and Ægilops. De Candolle positively declares rye and one kind of oats are now wild in their original condition in the Austrian empire. Mr. Buckman asserts that the wild English oats can, in a few years, be converted, by judicious cultivation and selection, into two races closely resembling two cultivated forms. However small may be the original number of species from which our wheat has descended, we have now no less than one hundred and sixty varieties that keep true, *except in the quality of the grain.* Philippar recognized three hundred and twenty-two varieties. As a matter of fact, so great indeed is the tendency of wheat to vary, that from selected heads it is necessary to select the similar grains, which are to re-produce exactly the desired peculiarity. Otherwise, shades of variation in these heads may give an aggregate variety, differing slightly from the desired form. In a field of wheat owned by one of the most celebrated European cultivators, Col. Le Couteur, and regarded by him as tolerably pure, Prof. Le Gasca found twenty-three sorts. Over and above all this, we occasionally find a new, well-marked form suddenly appearing, independently of all efforts at selection by man. Mr. Sheriff has raised seven new varieties, which are largely grown in Great Britain to-day. Certain conditions govern the sportive character of wheat. Thus, Darwin instances one form which in Spain was unvarying, but which in Germany would only truly re-produce itself during hot summers. Another variety kept true only in good land. Wheat speedily accustoms itself (within certain limits) to new life conditions. Thus, in France, out of one hundred plants of winter wheat sown in spring, only four produced ripe seeds; by sowing these, and selecting the ripest of their progeny, in three years this wheat habituated itself to ripening all its seeds. On the contrary, it frequently happens that at first the summer wheat, taken and sown in the fall, is winter-killed, and but a small proportion of the crop perfects its seed. But this seed, planted, and after selection re-planted, comes in a short time to produce good crops of winter wheat. Wheat from France, it was long since noticed by Kalm, needed to be acclimated before it would raise a crop in Canada. It was found that summer wheat from the most northern wheat-growing regions of Europe always did best in Canada. Climate affects *weight* of wheat. Of fifty-four varieties from the south of France and the Black sea, which were sown at Paris, fifty-two yielded wheat from ten to forty per cent. heavier than the original seed; but when this same wheat was returned to the south of France, it speedily relapsed to its light weight. Under the microscope, wheat resolves itself into two elements—starch and gluten. I speak without reference to its chemical qualities, and in so doing say the important distinctions of wheat structure resolve themselves into two elements.

Let us now suppose a cross section made of a grain of wheat. On the outside we shall find the true cellular coat, or the bran; immediately inside this we find the gluten, surrounding the central starch. In size, the starch makes up a large proportion of the entire grain. What part does each of these elements perform in the animal economy? There appears but little doubt that the bulk of all we use as food, (I say bulk,) is made up of four chemical elements—carbon, hydrogen, oxygen and nitrogen. Part of the food contains nitrogen, and part does not. Now, on this difference is based a division of all food into the tissue or muscle producing elements, and into the heat generating material. Those substances which repair the waste of our bodies by new creation of muscle, are found to contain nitrogen. Those which make heat are wanting in this element. They may contain carbon, hydrogen and oxygen. We find the gluten of the wheat contains the highly nutritious, nitrogenized constituents, and the starch simply the heating. Indeed it was found by the French gelatin committee that "the nutritive power of the gluten is so great and it contains such a variety of alimentary principles, that dogs (on which experiments were made) are well nourished, and can live indefinitely on it when taken as the sole article of food." Gluten bread, which is at once palatable and highly nutritious, has been made for the use of diabetic patients. I give here its method of manufacture. "The moist gluten is dessiccated at a temperature of 212° of Fahrenheit's scale. Thus dried, it has lost in great part its tendency to expand. It may then be used like ordinary flour, kneading it with sixty-six parts of water to one hundred; a half-hundredth of yeast is then added, and at the end of about half an hour the dough is put in the oven, in the form of a large twist." This gluten is readily obtained from wheat flour by washing it under a stream of water and over a sieve. The starch, sugar and soluble matters are carried off, leaving the gluten. A healthy Esquimaux youth will devour at a single sitting a fabulous quantity of walrus blubber—say, as a minimum quantity, ten pounds. Civilized explorers have discovered a partial equivalent in starchy substances.

We speak familiarly of wheat as the staff of life, and most justly, for in it we find as well proportioned a combination of these two ingredients as exists anywhere else in nature. I say it is there, but let me remind you that the gluten is on the outside, and hence most liable to be removed in grinding by the old processes. Careful experiments have shown that in making a barrel of flour there should be lost as innutritious only ten pounds. As late as 1862 the usual loss was from sixty to seventy pounds, and that, too, of gluten, the very muscle of the consumer, fifty pounds at least of which were thrown away in every two hundred and seventy pounds of wheat ground, and this in the very temperature under which we need a large proportion of strength-producing material. The figures become alarming when we look at the question of the wheat crop of America and Europe combined. Estimate it, as has been done, at 900,000,000 of bushels, or the equivalent of 200,000,000 barrels of flour, and taking the loss per barrel of gluten at fifty pounds, it gives the enormous weight of 10,000,000,000 of pounds of gluten yearly cast away to the inferior animals, whose purposes would as well be answered by the cereals of less value to man.

Place of growth exercises a notable influence on the proportions of gluten and starch found in different samples of wheat. The hard varieties and those raised in warm climates have most gluten or tissue substances, and least starch or heat elements. This is just what the climatic conditions would indicate as most needed by man. Grain cut before it is fully ripe is deficient in gluten. Thus, as the result of an analysis of Narboune wheat, we have that cut eighteen days before ripeness containing six, and that cut when ripe twelve per cent. of gluten. Some experimenters, Lavini among them, give even greater differences. It is interesting to note at how early a period some observing men had noticed the fact of vegetable degeneration, and had discussed the remedy. Thus we have Virgil, as quoted by Darwin, writing—

> "I've seen the largest seeds, though viewed with care,
> Degenerate unless the industrious hand
> Did yearly cull the largest."

This, as you well know, was nearly half a century before the commencement of the Christian era. From Oswald Heer we learn that the grains of our modern wheat are almost double the length of the primitive varieties of wheat cultivated by the early inhabitants of Switzerland. So, too, the forms of barley at present cultivated surpass in size and productiveness the barley grown by these early people. We know from the same distinguished authority that some of the forms of wheat originally cultivated have become extinct. We can also trace the introduction of improved forms and the discarding of the old, as men passed from the stone to the bronze age of civilization.

Indian corn is *most probably* a native of America. This seems to be the best supported view. We at least know it was grown and used by the aborigines of this continent as early as the period of its discovery. The range of its cultivation appears to have been from New England to Chili. That it was in use during the Inca rule in South America we know from the remains found in tombs dating at least as early as this period. Darwin even gives its cultivation a higher antiquity. On the coast of South America he found ears of it mixed with sea-shells, on a beach which he thinks has been raised eighty feet above the sea level since the corn was placed there. Just how conclusive his reasoning is on this point I am not prepared to say. To my mind it suggests a doubt. But apart from Darwin's argument here, all analogy would lead us to infer the early redemption from the state of nature of Indian corn. Its general, widely extended area of cultivation, too, is another argument in favor of the same thing. We know it does not grow wild in the United States. We are almost sure it does in some parts of South America. Think of the slow means of diffusion, the imperfect system of traffic among the Indians, and you can readily imagine a long time must have been required before it would be sufficiently valued by neighboring savage tribes to make its acquisition desirable. Then, too, after its uses were known and appreciated how many centuries would have been demanded to extend its cultivation from South America to New England, under the slow *regime* of Indian trade.

The variations in Indian corn are marked and extraordinary. Take the height of the stalk for example. We have it to-day ranging from eighteen feet to sixteen inches as in a dwarf variety mentioned by Bonafous. Mark the varying forms of the ear, being long or short, thick or thin, simple or branched, these peculiarities each capable of perpetuating themselves. I would here allude to a fact not quite clearly enough understood. We are in the habit of speaking of this or that variety as produced by cultivation. The fact (except in the case of hybrids made by the intervention of art) is this, that in all plants there exists an innate tendency to vary, and that man, finding this variation, perpetuates it by selecting the individuals in which the peculiarity is marked and growing from them. In a few years the peculiarity becomes a life habit as fixed as any of the original traits, but not more fixed. This plant may assume a new line of variation and again sport off into new characters. Or if neglected it may revert to the original form. This reversion to a typical form seems due to neglect, placing the offspring in conditions similar to those under which the parent flourished. If neglect still leaves the plant under changed conditions it may not return to the parent form, but only to a growth as rude and degenerate as the parent, though still different. We all know the rows in the ear vary from six to twenty, or the grains may ignore all law in their arrangement and be simply scattered. The grains of one variety may be seven times as heavy as those of another. Some kinds have greater power of resisting dry weather than others. Some again are early in attaining their growth, some late. Take too the subject of acclimation. Seed from Virginia does not at first ripen its product in New England, nor will corn in New England ripen its ear in Canada some degrees further north; but years of culture and of selection of the ripest grains from which to plant will enable one to grow Virginia corn even in Canada. Some years ago a corn known under the popular name of "nigger-head," in the State of Delaware, was introduced into the valley of the Juniata. It required at least three years to make it able to resist our early frosts. The effect of European climate on American varieties is remarkable. I quote at second hand from Metzger's experiments in Germany on seed-corn from the warmer parts of America. "The first year the plants were twelve feet high and few seeds were matured, the lower seeds keeping their true form and the upper slightly changing. In the second year the plants were nine to ten feet high and ripened the seeds better; the depression on the outer side of the seed had almost disappeared and the original white color was verging towards duskiness. Some of the seeds had even become yellow, and in their rounded form simulated European corn. The third year this corn resembled much more closely the European form and had lost all resemblance to the originally quite distinct American seed. In the sixth generation this corn *entirely* resembled a European form, and now is still cultivated near Heidelberg, where it is distinguished from the rest only by its more vigorous growth." Australia is now producing some of the finest corn that reaches the British market. It is largely cultivated also in some parts of Africa. In India the cob of one variety is roasted and sold about the streets, as itinerant venders do chestnuts in the streets of our cities. In 1863 nearly 32,000,000 of bushels were imported from various sources into Great Britain; of this the largest part was used in those islands. Its estimated value was 20,000,000 of dollars.

In Europe, and especialy near the sea, we have a bi-ennial plant, with fleshy, lobed leaves, undulated or wavy on the margins, and covered with the sea-green bloom. In general appearance this plant is widely different from our common cabbage; in fact there is no one form of this vegetable that bears a very great resemblance to the wild sea-side bi-ennial. Yet of all the multitudinous forms of cabbage in existence, most probably, this is the parent stock. The Romans seem to have introduced the garden variety into Britain. This all-conquering nation appear to have also carried it into other regions. In Scotland it was unknown prior to the usurpation of the English throne by Cromwell; his soldiers introduced it into the country. Hence we may infer it has been in use over a large part of the civilized world from an early period. We know the principal kinds of cabbage have been in use from a time as early at least as the sixteenth century. There seems good reason for the conclusion of Darwin, that the numerous inherited peculiarities have been marked for a long time. Yet great care is required to prevent crossing of different kinds. Darwin raised two hundred and thirty-three seedlings from cabbages of different varieties, that had intentionally been grown within easy reach of each other, and of this number one hundred and fifty-five were clearly deteriorated and mongrels; "nor were the remaining seventy-eight all perfectly true." Indeed, from such a statement, we are lost in attempting to decide whether we are more indebted to accident or design for the numerous varieties now known. It would be useless to undertake even an enumeration of them, much less to enter into an account of the peculiarities of each.

Next in order we will take up the garden pea. Dr. Alefield has studied this group of plants with especial care. He concludes that at least fifty varieties are specifically the same, and have of course descended from one parent. During the stone and bronze age a small pea, closely allied to the field pea of Europe, was in use among the lake-dwellers in Switzerland. To-day we have a variation in height from one to eight feet. In the sugar pea the pod is wanting in the inner, harder film; it is therefore eaten pod and all. Now here is a group in which the greatest care has been bestowed on the pod; hence out of eleven sub-varieties known to Mr. Gordon, it is the pod which exhibits the greatest tendency to vary. The history of some of the reigning favorites is rather a checkered one. Loudon informs us that the varieties most approved in 1821 were nowhere to be found in 1833, while those of 1833 seem to have been supplanted as early as 1855. It is to be presumed that some varieties have had a longer run of popularity. The native country of the cultivated pea is supposed to be the south of Europe. One writer asserts the Crimea. It was introduced *via* Holland or France into England, during the reign of Henry VIII. Still in the time of Queen Elizabeth they were brought from Holland, and esteemed "a rare, dainty dish for ladies—they came so far and cost so dear!" In 1660 the taste for green peas began its course, and up to date has gone on in an ever widening current.

Beans of a small kind were also in use among the lake dwellers of Switzerland. Dr. Alefield enumerates, I think, about 40 varieties now grown.

If the discovery of America had yielded no other result to the Old World than the bestowal upon it of the common white potato, it would have repaid over and over the fitting out of the vessels for its discovery. The introduction of the potato into Ireland in 1586 is attributed to colonists sent from England to Virginia, under the auspices of Sir Walter Raleigh. It still grows wild in Chili, in Peru and in Buenos Ayres. *Under the microscope* the substance of the potato resolves itself into starch, granules and an albuminous juice. Perhaps, as a general average, they contain water in proportions amounting to three-fourths their weight, the other fourth being starch, gum, sugar and albumen, a little vegetable fibre and fatty matter. As so many reports are current regarding the nutritive properties of this tuber, I will quote from a high authority in such matters. Dr. Austin Flint, Jr., writes: "It (the potato) undoubtedly forms a larger part of our vegetable food than any other article, except wheat, and of all vegetables it is the one that becomes least distasteful from continued use. In Ireland the potato forms the greater part of the diet of the poorer classes, but those who live *almost exclusively upon it are not well nourished.* A study of the proximate composition of the potato shows that it cannot of itself be capable of maintaining the organism in full vigor on account of its great deficiency in nitrogenized and fatty materials." To this statement objectors, and honest ones too, could be found, but their dissent will have to give way before the combined forces of chemical analysis and absolute experiment. Even if a substitute were found for the potato, one which was more nutritious and not liable to utter failure from parasitic growths, it is doubtful if it could be supplanted in the popular estimation. Starvation in Ireland is simply synonymous with the failure of the potato crop. Were I to assert that from the single species now wild in Chili not less than three hundred varieties have been raised, I should not be far from the truth. Some years ago Mr. Lawson enumerated one hundred and seventy-five in Great Britain alone. Contrast some of our round tubers with one form known in Peru which is straight, six to eight inches long, and not thicker than a man's finger.

"Again they vary in color, in flavor, in quality, in period of maturity. Mark here, that the great, if not entire, attention has been given to the tuber; and whilst the varieties of the tuber are almost without number, the leaves and stock differ not nearly so much. Do potatoes cross? It is not more strange that the tuber should be affected by the cross fertilization of the flower above ground, than it is that a child by a second marriage should resemble the mother's first husband instead of her second. This fact is unquestioned and unquestionable, and the more you think of the subject the more you will be convinced of the parallelism existing. Indeed, we know that before any ovule is fecundated, a given quantity of pollen has been expending its energies in satisfying the wants of the plant at large. This done, the surplus will go to forming the seed. Though the seed be not planted, is it not probable that part of the pollen's influence has reached even the tuber? "I take the following facts from a pamphlet on the potato, by W. F. Wylie: It is estimated that not less than 150,000,000 of bushels of potatoes are consumed annually in the United States as an article of food. The average yield of starch is said to be from eight to twelve pounds from one bushel of potatoes. In Stowe, Vermont, five factories use each year one hundred thousand bushels of potatoes in manufacturing this article. One calico-print works in the country used sixty thousand pounds of starch in a single year. The late Rev. Chauncey Goodrich, of Utica, New York, spent fifteen years in his experiments for the production of new varieties, and raised over sixteen thousand seedlings. Among all these he esteemed two seedlings from the Cusco the very best—the Harrison, for a winter, and the Early Goodrich, as an early variety. The Early Goodrich may be eaten in from sixty to seventy days after planting. It yields from three to four hundred bushels per acre. The Early Rose is from ten to fifteen days earlier than the Goodrich, and is now regarded as the best and most productive early potato known. Henry Clayton, of Delaware, reports planting on May 4, one pound of them, and from it taking up, on July 10, ninety-eight pounds of fine potatoes. They were perfectly ripe at the time, and might have been taken up two weeks earlier, if intended for the table. (So far from Mr. Wylie.) This was from the date of planting to the time of raising, only sixty-seven days, and if we deduct fourteen days we have fifty-three days as the time required from the planting until they were fit for immediate use.

In 1868, New York State produced 25,000,000 of bushels of potatoes. These were raised on 254,403 acres of land. A little calculation will show you that this was only a little over ninety-eight bushels per acre, on the average; making all due allowance for poverty of soil, slovenly culture, etc., etc., and you have an enormous disparity between the yield of good and bad varieties. This, too, is greatly increased when we remember that of the 25,000,000, at least one-fourth may be fairly regarded as the product of choice, well selected seed; deduct this and divide the remaining crop by its proper proportion of acres, and see how fearfully we rob ourselves of what the soil would produce if more skillfully managed. Nay, more. Look at it from the stand point of poverty and crime induced by high rates of food, and you see that we may fairly take that deficit into account as an element of public morals. Some shrewd missionary has remarked, he always found his hearers more charitably disposed toward him and his message after a full meal. There is a moral in the statement. Want always breeds crime. We are not sure that one-half of all crime is not the legitimate out-growth of want. I should be sorry to hold a view so disparaging to my race, as to shift criminality, in all its huge proportions and hideous details, from necessity under poverty, to total depravity from choice. Malthus was right, when long ago he taught that the earth was unable to support all life that sprang into being on its surface, and there existed a stern necessity that much of it should be swept off yearly, to enable the rest to remain. His figures, now in this day, can gainsay, but the acceptance of this doctrine brings with it the duty incumbent on us, that we decrease the yearly destruction by so cultivating our soil, so sowing the most prolific seed, as to reap the largest returns. We are rather amused now, in looking over the history of the introduction of the potato into Europe, to find it recommended to be eaten as a delicate dish, and not as a regular article of food. In the "reign of James I, they were so rare as to cost two shillings a pound, and are mentioned in 1619, among the articles provided for the royal household." In 1633, the royal society strenuously urged their increased cultivation, as among the means to be resorted to for the prevention of famine. But it required nearly a century to popularize them in England. It was not until 1725, that they were cultivated in Scotland. This was one hundred and thirty-nine years after Raleigh had introduced them into Ireland.

Strange that immediately after the potato I should talk to you on tobacco.

Yet botanically, they are near relations. Stranger still you may add, that I should talk to you at all of it. Perhaps I might, if pressed, admit that it is an evil, but I should be sure to qualify that statement with the remark that it seems to be a necessary evil; that if it be a tyrant, it enslaves a larger proportion of the world's inhabitants than any other vegetable, and this, too, of men who, in most other respects seem to be tolerably free. I do not wish my position to be tortured into an advocacy of the vile weed which so many of us love, but I do wish to state what little good I can find in its favor. Let me refer you to the works of Stille, the most distinguished therapeutist America has ever produced. In his great work I find this:—"The habitual use of tobacco by chewing, smoking and snuffing, is productive of peculiar effects, and when carried to excess, of certain definite morbid states. Chewing tobacco in moderation has not been shown to be mischievous, however repugnant it may be to persons of refinement and delicacy." Dr. Hammond has proven that a *moderate* use does, beyond any peradventure, promote digestion. Its use and abuse are as different as the use and abuse of fire. The criminality of chewing or smoking does not consist in the act *per se*, but in your and my inability to stop short of its abuse. For this position we have high science as well as the science of common sense to back us. Here let us avoid the error of thinking all the tobacco consumed is the product of one species. At least five species enter into competition in the market. According to Humboldt, the name is derived from a Haytian word for the pipe, in which it is smoked. In England the cultivation of tobacco is to a certain extent illegal. Smoking is a custom known far back in antiquity in the eastern hemisphere. Before the advent of tobacco into Europe, hemp and colts-foot were used as equivalents. The adventurers who followed the fortunes of Columbus, bore with them on their return to Spain, the habit of smoking. In a short time it spread over the continent. Sir Walter Raleigh introduced it into England in 1586. The history of many of the anti-tobacco movements reminds one somewhat of Burns's account of the mishaps of John Barleycorn:

"There were three kings into the east,
  Three kings both great and high,
And they hae sworn a solemn oath
  John Barleycorn should die.

They laid him down upon his back,
  And cudgel'd him full sore;
They hung him up before the storm,
  And turned him o'er and o'er.

They filled up a darksome pit
  With water to the brim,
They heaved in John Barleycorn,
  There let him sink or swim.

They laid him out upon the floor,
  To work him farther woe,
And still as signs of life appear'd
  They tossed him to and fro."

King James published a famous counterblast against its use, in which his majesty proved himself a past-master in scurrility. "Popes fulminated bulls against it, and Sultans sentenced smokers to the most cruel kinds of death. Persecution, however, only helped to spread it," until it has become an evil of the most gigantic proportions. It is now more generally in use than any other substance derived from the vegetable kingdom. In 1863, the imports of it into the united kingdom of Great Britain, reached 55,122,048 pounds, of which 37,616,214 pounds were retained for home use. The duty on it came to more than $25,000,000.

The most reliable authors regard all the *grapes of Europe* as the descendants of a single species now wild in western Asia; to this statement there are but few objectors. Be this as it may, from at most a few primitive forms, we have now nearly one thousand varieties in cultivation, though but a small proportion of them are of any real value.

Darwin writes of peaches and nectarines: "We have excellent evidence of peach stones producing nectarine trees, and of nectarine stones producing peach trees; of the same tree bearing both peaches and nectarines; of peach trees suddenly producing, by bud variation, nectarines, (such nectarines re-producing nectarines by seed,) as well as fruit in part nectarine and in part peach; and lastly, of one nectarine tree first bearing half and half fruit, and subsequently true peaches." These facts, strange as they are, come so well vouched for as to leave no ground for doubt. We learn from the same author that in the commencement of the Christian era not more than five varieties of the peach were known; the nectarine then being unknown. It is by many supposed that the peach is only an almond modified by long culture. We do not know of its having ever been found in a wild state. Downing enumerates in the United States seventy-nine native and imported varieties of peach, and in England Lindley has extended the list to one hundred and sixty-four varieties of peach and nectarine. To give you an idea of the real magnitude of the peach trade in Delaware and Maryland, I will mention that one railroad has this year carried from these States at least 12,000,000 of pounds of peaches. This does not include the large quantity which reach Philadelphia by water. Delaware alone employed three thousand men, women and children in gathering the crop. The yield of the entire peach growing region has been estimated for this season at 5,000,000 of baskets, or 3,125,000 bushels.

It seems to be conceded on all hands that the innumerable forms of the gooseberry have descended from one common species. Now, mark the advance. Classical writers do not allude to the fruit. It is barely mentioned in 1573. In 1629 eight varieties were known. In 1842 one hundred and forty-nine varieties were grown. In 1862 no less than two hundred and forty-three distinct varieties were entered, and had taken prizes. The natural wild fruit weighs about five pennyweights. In 1786 cultivated ones, we find, were weighing ten pennyweights. The year 1817 gave one weighing 26 dwt., 17 grs. In 1825 another reached 31 dwt., 16 grs. In 1830 a variety called Teazer weighed 32 dwt., 13 grs. In 1841 Wonderful weighed 32 dwt., 16 grs. In 1844 the London variety gave 35 dwt., 12 grs.; and in 1845 it reached 36 dwt., 16 grs.; and in 1852 it gained the unprecedented weight of 37 dwt., 7 grs. This is very nearly eight times the original weight of the wild fruit. These statistics are from English sources, and serve to show how scientific culture may, from an unpromising parent stock, produce a fruit much more prolific and more delicate. I would not venture to assert that even yet we have reached the limit in the development of the gooseberry.

In 1814 not more than twenty varieties of pansy were known. In 1835 a whole volume was devoted to it, and 400 varieties were known and for sale.

In 1596 the hyacinth was introduced from the Eastern Mediterranean region into England. In one year four varieties were raised. Eight varieties were known in 1629. In 1768 nearly 2,000 kinds were known. Since then it has lost favor in the public estimation, and in 1864 there were but 700 found in one of the greatest gardens of Haarlem.

Under the head of plants of cultivation I might, perhaps, fairly consider the large class of weeds which infest our ground. Now it is not to be wondered at that the majority of these intruders are of foreign origin; for example, May weed, a European plant. Before the discovery of the continent, when this broad land was one almost interminable forest, we might expect to find a flora of shade-loving character. But civilization, sweeping away this growth of timber, changed the features of the country. Old native plants would not find their accustomed shade and would fast disappear. What follows? The ground would be left open to immigrant plants. There would be no natives to contest the occupancy with them, and soon they would establish themselves in the territory thus abandoned. The new conditions consequent upon the destruction of the forests would be as fatal to the one class as it would be favorable to the other. We have examples of this in almost every field by the road side.

But not only do plants take possession of vacated territory. There exists an actual conflict, at times, between occupants and intruders, in which it frequently happens that the less valuable but more hardy intruder gains the day. Who is not familiar with the fact of blue-grass smothering out clover? A host of vile weeds may infest a field, but the Canada thistle will make an inroad upon the land, and, if not destroyed, will, in a few years, over-run weeds and cultivated plants alike. Or, take the common yellow toad-flax, which now may be seen covering acres to the utter exclusion of everything else. This worthless weed was sent from Wales, as a garden flower, to Mr. Ramstead, of Philadelphia. A century ago Bartram said of it—"The most mischievous of these weeds is the stinking, yellow Linavia. It is the most hurtful plant to our pastures that can grow in our northern climate. Neither the spade, plow nor hoe can eradicate it, when it is spread in a pasture. Every little fibre that is left will soon increase prodigiously; nay, some people have rolled great heaps of logs upon it, and burnt them to ashes, whereby the earth was burnt half a foot deep, yet it put up again as fresh as ever, covering the ground so close as not to let any grass grow amongst it, and the cattle cannot abide it." This statement may be over-drawn, yet it is a most annoying intruder, and has spread over a large portion of the Union from one starting point, at Philadelphia. Take another example: In the valley of the Shenandoah the blue-weed has become a fearful pest. For years it has been growing there. Within a comparatively short time it has appeared in Chester county of this State. Within two years I notice that it is spreading rapidly in Mifflin county. This year I have seen it over-running some stiff, clay soils in Centre county; and I venture the assertion that not many years will elapse before it will be as great a nuisance here as in Virginia. Now, gentlemen, these are practical facts, and indicate two things: first, the necessity of every farmer's knowing enough of botany to recognize these intruders at sight, and learning their habits; and second, of making an end of them at once, when so recognized, before they have become public pests.

Just here allow me to put in a plea for a higher, more practical, scientific education of our youth. I do not mean higher simply in the usual acceptation of the term, nor more scientific, as alluding only to pure science, but to that practical application of a larger range of facts, combined with a deeper knowledge of the laws under which these facts are grouped. I do not disparage, on the one hand, the time honored classical course, nor the absolute, unapplied science that savors of the secluded, book-surrounded study. I simply ask that we honor labor by adapting to its needs a course of learning for the young men who are desirous of understanding the laws of agriculture, and the principles underlying the mechanic arts. In the colleges now springing into being under donations from the General Government, I would give classics a lower stand, and science a higher, than the purely literary institutions of the land adopt. Ignoring neither, I would place them on a level, and to both, join the common sense applications of real life. No student worthy of the name underrates the value of abstract learning. But, on the other hand, the successful men of the world, who make fortunes for themselves and great national improvements for the race, will tell you, and with truth, that the art of doing is really greater than the science of thinking, for the first includes the last. All nations pass through a transition period, between incipient civilization and high culture. The one comes when men begin to grapple with nature, to level her forests, to tunnel her mountains and open her rivers. The other, when all her deserts bloom like gardens, and her waste places bend under great harvests. The first is the practical period, when man opposes man with rude vigor; the second is the æsthetic period, when he compares refinement with refinement, builds great art galleries and sends the surplus of his mental and material wealth to enrich the darker parts of the earth. Need I say to this audience that the aspirations of our young men, in the way of education, indicate clearly, that we are yet in the practical age? Witness the crowds thronging the halls and laboratories of Cornell and Kentucky Universities, or the Polytechnic College and the Pardee Scientific School of this State. Neither pure science nor classical studies are unproductive. They both are legitimate, and both are great powers in elevating our national character, but they are not *so* productive as educated practice. In this State there are now hundreds of characters who, ten years hence, will be the land's workers, who desire liberal culture, but who do not want to toil through Homer or Horace to attain it, when it can be had equally well in more practical branches, or to spend three years in gaining the degree of bachelor of science and all the mysteries of qualitative and quantitative analysis, unless they are at the same time taught to convert this learning into material prosperity by knowing how to use it. These statements may grate harshly upon the feelings of those who advocate the old system of education; but are they the less true for that? Suppose we do assume that young men are not fit judges of what they want or need, does that confer an education on those who refuse to spend their limited means in obtaining such mental training as they *imagine they do not want?* Will placing the ordinary college curriculum on the one hand, and no equivalent alternative on the other, before them, give the land the educated artisans and farmers it needs to develop its resources, and to exalt the standard of American industry? More important still, will it lead them to the highest estimate of their own real worth and manhood? I think not.

Not many years ago a distinguished philosopher remarked of agriculture, that it seemed capable of less improvement than any other department of human activity. He argued that the Creator intended a large part of our race should always continue mere "hewers of wood and drawers of water," and for this reason made the avocation which embraced the largest share of manual labor a stationary one, simply to keep open a suitable field for the unaspiring portion of mankind. How signally has this fine theory failed. During the last half a century what other department of industry has made the same immense strides that agriculture has? May we not justly look upon these advances as the earnest of better things? When to great, generous yield from the soil, we shall expect to find its cultivator not only a man skilled in his art, but learned in the principles on which his art depends, who can grow not only the fruits of the earth, but can also appreciate the poetry nature has scattered around him. Then, at least, he will redeem and purify his labor from many crude notions and false theories which have encumbered it, lo, these many years.

I have already trespassed too long upon your time. If I have shown you that the rich harvests which this year loaded your fields, and that the mellow fruit beneath whose weight your trees are now bending, were once, like our ancestors, uncultivated and undeveloped in their real value and æsthetic character, I have done enough. You may ask me now for the evidence that the improved science of agriculture proceeded, and only could proceed in its onward course, *pari passu*, with the mental growth of our race. I can yet refer you to the discovery, for example, of the magnetic compass which made it possible to cross an unknown ocean, and find on this continent the potato and the Indian corn, now redeemed from their wild, almost unprolific condition, and made, in some of their numerous varieties, to furnish sustenance to myriads of the human race. Or I may remind you that numbers of the beautiful flowers, which cultivate the mind and delight the eye, are the result of the discovery of the sexual relations of plants, and never could have been reared but for the mind so accustomed to observe, experiment and generalize as to detect, in all its bearings, the significance of the relation existing between pistils and stamens.

The old idea everywhere, and the prevalent idea yet somewhere, that to cultivate the soil man not only did not need education, but was often the worse for it, is too glaringly at fault with the spirit of your calling to-day to need a refutation. If you consider an educated man in the narrow light of a mere theorist, I would remind you that no man fails because he has *too much theory*, but because he has *too little practical knowledge*. Remember, too, that in the true sense a theory of agriculture is not an abstract conception, but is the out-growth of the knowledge and practical tact you gained by the sweat of your brow in the field. To say that you discard all theory, is simply to take another means of asserting that you never think; for if you ever made two or more practical observations in your life, and from those observations drew a conclusion, you have been guilty of theorizing. Accept it as a fact then, that the hand made horniest by hardest toil, may belong to the head made most God-like by the highest appreciation of nature's laws.

COUNTRY ROADS AND ROAD LAWS.

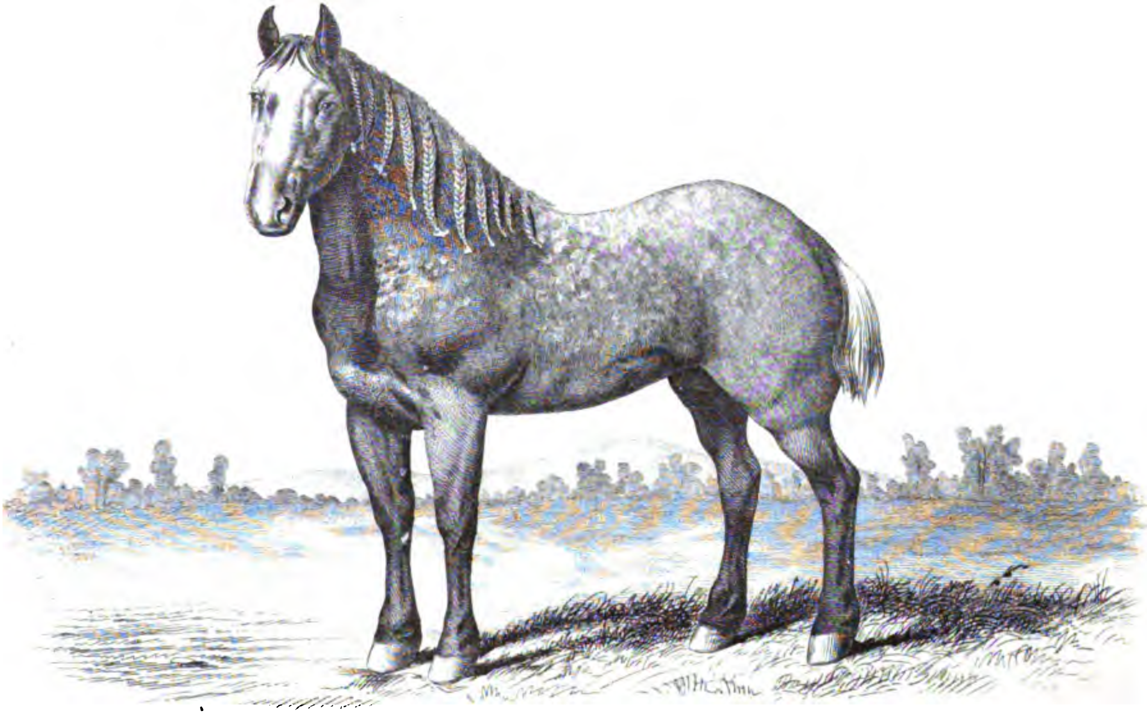
The term "country roads" is intended to include all descriptions of wagon roads in rural districts, which are made and repaired under the general direction of "county commissioners," "police," or "circuit courts," or, as in some States, under a board of "town supervisors," and in others under the "selectmen" of the towns. The immediate supervision of construction and repairs is generally under the direction of local "road supervisors," or "path-masters," as they are termed in some districts. The tax for road repairs is generally a capitation tax on male citizens between sixteen and sixty years of age. The number of days' labor required on public roads per annum varies in the different States from one day to fifteen. Although this system of levying road tax generally prevails, it is conceded that it is very defective, and, so long as it is continued, poor roads will be the inevitable consequence. There is probably no public interest in which sound and intelligent legislation is more needed than in the enactment and revision of our road laws. Any system which provides for the assessment and collection of a road tax in labor will be found inefficient, and totally inadequate to the purpose for which such tax is levied. The recorded experience of reliable men in all rural districts in this country—in some cases covering a period of more than two hundred years—of the defects of this system, is sufficient evidence that reform is greatly needed.

Although the amount of statistical information obtained in answer to the circulars issued from this Department is far short of what was anticipated, we are enabled from the data furnished to arrive at many important facts, that will serve as guides to those specially interested in the construction and repair of roads. It was hoped that the returns would be so full and explicit that a complete tabular report could have been compiled in accordance with the questions propounded.

The unsettled condition of many of the southern States since the close of the war has been such that a few repairs of bridges or roads have been made, and probably few will be undertaken until reconstruction is thoroughly effected.

A report from Florida says: "No road laws, no bridges; streams are crossed by ferries, fording, or swimming."

P. T. Tannehill, of Henderson county, Texas, says: "Our roads are not worked, the wagoner making his own way. Soil remarkably favorable for roads. No macadamizing material in the State, none needed. Road laws in this magnificent State, like other laws, seldom executed. No turnpikes;



THE NORMAN PERCHERON STALLION, PRINCE IMPERIAL,
Owned by [illegible], Awarded 1st Premiums Exhibitions of [illegible]

don't need them. Roads last until they become too miry, when wagoners cut a new one. Texas can boast of the best roads, with the least work, of any State in or out of the Union. Our citizens generally regard work as *unconstitutional.*"

E. S. Holden, of Stockton, San Joaquin county, California, writes that "the general character of public roads throughout the State, during wet seasons, is bad; in January and February, almost impassable. Necessity has stimulated the people to construct good and durable roads and turnpikes, and quite a number of pikes, from two to thirty miles in length each, have been finished, or are in process of construction. Those constructed will be passable at all seasons of the year. They are made by the use of heavy, strong plows, with eight to ten yokes of oxen, or as many horses. The road-bed is back-furrowed up, so that the side gutters are from two to four feet in depth; the road-bed made is usually forty feet at base, and about thirty feet on the top, the natural soil covered with gravel twelve to fifteen inches in depth. Such roads become hard and dry, and equal to the best roads in the eastern States. Thus constructed they cost about $6,000 per mile. There are about sixteen miles of such roads in this county, and it is proposed to construct other similar roads soon."

The report from Utah Territory states, that "there are in Salt Lake county thirty-two miles of gravel road, and about eight miles of macadamized. The average cost of the former is $3,500 per mile; of the latter about $3,800 per mile."

Report from Marshall county, Iowa, states that one mile of graded and graveled road in that county costs $10,000, and yet the average cost of road repairs in the county is only $3 per mile. Report from Fond du Lac county, Wisconsin, states that there are twenty miles of turnpike in that county, twelve miles of which are graveled, and cost $1,000 per mile; and eight miles macadamized, costing $2,000 per mile.

The report from Baltimore county, Maryland, states that that county has one hundred and forty miles of macadamized road, which cost $5,000 per mile for construction, and $100 per mile annually for repairs. The metal of the roads is principally of very hard trap-rock, expensive to break by the hand process, by which it was all prepared. The quantity originally applied was not more than ten cubic feet per linear foot of road, or about two thousand perches of twenty-five cubic feet per perch per mile.

Washington county, Maryland, has about one hundred miles of macadam road, which cost $2,100 per mile. This metal is of limestone rock, which is obtainable on the line of all the roads, and may be broken at about one-half the cost of the trap-rock. The repair of these roads is said to cost about $50 per mile per annum.

William Bacon, of Richmond, Berkshire county, Massachusetts, says:

"We have a system of taxation for making and repairing roads that is tolerated by a law of the State, and is as old as the roads. It requires towns to raise annually such an amount of money as may be deemed necessary to keep the roads in repair for the year, to divide the towns into districts, and appoint a highway surveyor to each district, whose duty it is to see that the money apportioned to his district is seasonably and properly expended.—This system is generally adopted in agricultural districts, and is popular, as it gives to any one the privilege of paying his tax in money or working it out with teams, at a price stipulated by the town. The system is good where the people are all interested in good roads, but there are many who are never ready to work or pay; and, if they pretend to work, it is more of a holiday affair than a matter of public benefit." This is the general experience of all observers of the working of this and similar systems. Mr. B. adds: "We had formerly many turnpike roads in this county, but the introduction of railroads, which now traverse more than half of the towns in the State, has set them aside entirely, and all have become county roads."

This is the case in many other districts, even where railroads are not so numerous as in Massachusetts. The most favorable location for a turnpike is frequently selected by the railroad engineer, nearly parallel with the railroad or contiguous to it; hence much of the heavy transportation is by rail, and the collateral turnpike is little used. With the increase of railroads in all parts of the country, the effect on nearly parallel turnpike roads will be as above described; hence, when locating a new turnpike road, it will be well to consider the probabilities of the construction of a railroad at an early day in the same direction or route. If probable that the railroad will be constructed at no distant day, and yet the necessity is great for a hard road for immediate use, the width of the hard bed of such road might be made as narrow as would answer, thus reducing the cost of the road, and correspondingly reducing the sum sacrificed by the loss of traffic which may leave the turnpike for the railway. While the foregoing is undoubtedly true, as regards turnpikes running in the same direction and near the railroads, it is equally true that these same railroads will cause an increased demand for improved lateral roads, by which products may reach the iron way. As the railroads usually thread the valleys and mountain passes, and cannot be worked profitably in the direction of the heavy mountain slopes, the products of the hill country and of the vales between it and the railroads, together with return supplies, must be transported on wagon roads, at least until a great improvement is effected in the traction of the locomotive. As these roads will be permanent, and are frequently required to overcome heavy grades, skillful engineering, thorough construction, and repairs are demanded.

The reports from nearly all the States in which "plank roads" have been tested, under a great variety of circumstances, concur in condemning them on account of the great cost of construction, as well as for their lack of durability. From careful investigation we find that they have generally become unfit for use in from five to eight years, even where the material used was of a good quality. One plank road only is mentioned on which repair with the same material is continued. For their average cost, see statement. The agents of decomposition, heat and moisture, being everywhere active, timber of the same kind and quality is found, when used in plank roads, to be most durable in climates and positions unfavorable to a perpetual supply of these elements. The writer was familiar with a plank road in Madison county, New York, about twenty years since. This road was mainly in an elevated mountain region having a northern aspect, and was covered with snow on an average fully four months of the year, and yet the remains of the material used, it being hemlock three inches in thickness, were all removed in eight years. The same material used in the Carolinas or in Florida would probably have become worthless in four years. A slight covering of earth on the planks is found to hasten decay, though it prevents wear. Yellow pine and cypress logs, used in the southern States in "corduroy" or causeway roads, where the logs are constantly covered with water from never-failing springs, and with a covering of earth of twelve to eighteen inches, and shaded by a tall, dense forest, have been known to remain sound for thirty years.

The causeway of logs has been a common mode of primitive road making in low marshy regions, and is still common in the southern States, even on mail routes. The logs should have a good covering of earth, and depressions occasioned by irregular decay should be repaired as they occur. The durability of causeway logs is much greater when covered with ten to twelve inches of compact clay well rounded off, and if it is obtainable, with gravel on the clay, than where they are entirely covered with gravel; the latter being porous, rain falling on the road-bed penetrates directly to the logs, and draws the warm air after it, thus rapidly promoting decay, while the clay covering will shed off the water before it reaches the logs. The log causeway system of road making in regions where the soil is wet, timber abundant on the spot, only costing the cutting, and drainage among the green roots too expensive, must necessarily continue in use many years to come. From the statements elicited, it appears that a very large proportion of the roads of all the States, even in the older ones, are little more than a belt of natural surface, just wide enough to admit of vehicles passing when they meet; sufficiently cleared of trees, rocks, and stumps to be passable with the worst marshes causewayed. Many of the unfordable streams are still crossed by flat-boat ferries of the most primitive character; more shallow ones are forded, and a tree felled across the stream for foot travelers, is the only bridge seen on streams many miles in length. The primitive bridges for vehicles on such streams, are usually made by placing three or more round logs from bank to bank, without abutments, and covering them with flattened poles. As civilization advances, or these primeval structures become unsafe, their places are usually supplied with hewed or sawed timbers and flooring, with "King's post truss" on either side, using pins or wedges instead of the rods, or bolts and nuts used in more modern structures. Unless suitable stones are at hand, and more convenient than timber, logs are flattened and pinned one upon another, and used for abutments. These are in turn supplanted by more scientific wooden structures, such as the "Burr," "Howe," "Improved Howe," and other forms of trussed wooden bridges; or perhaps by iron bridges constructed upon some one of the many plans now in vogue—those known as the Bolman and Fink being considered the best in use in this country for railroad purposes.

With each successive improvement in the construction of bridges in all districts, where other characteristics of civilization, such as the clearing up of forests, &c., have made collateral and corresponding progress, it has been found necessary constantly or periodically to increase the span and height, from the water at ebb, of all briges to be built. This necessity arises from the more sudden escape of rain-fall from the surface of cleared and swarded land, than from that of the forest with its accumulated mulch of ages, maintained by a net-work of undergrowth, through which water is greatly impeded in its flow to the stream, and a much larger proportion of it is absorbed by the earth than when flowing on a surface of smooth turf. Another effect of the sudden rising of streams from the rapid escape of water into them during excessive rainfall, is a waste of the fertility of steep tillage lands, which shed water directly into the streams. Where interval lands to any considerable extent border on the streams, this waste is intercepted, and the fertile washings of the higher lands are deposited on the meadows, by which the fertility is augmented by each successive flood, often forming valuable muck deposits which enterprising farmers return to the hilly lands, thereby restoring their lost fertility. Where the interval land is narrow, the effect of the excessive, increasing floods is to sweep these washings into the creeks and rivers. The effects of floods in dissipating the fertility of rolling, cleared lands bordering on streams may be prevented, in a good degree, by keeping them in grass as large a portion of the time as is practicable; and, when they are laid down to grass, by constructing numerous surface water furrows in succession, from the summit to the base of slopes, giving them good capacity and very gentle fall; thus the washing of the soil will, in a great degree, be prevented, a larger amount of water will be absorbed, and that escaping to the streams will be a longer time in reaching them, and the destructive effects of inundation lessened materially.

The proportion of area of the cleared lands of the middle and the eastern States, which would be greatly benefitted by the precautionary system of surface gutters above recommended, is very large, and the annual waste of fertility, and the damage from loss of fences, bridges, buildings, and even of human life, are so great as to warrant a notice in this connection, apart from its direct pertinency to the general subject in hand. We have been frequently called to re-locate roads that have been entirely destroyed by floods in collateral streams, many of which roads had been repeatedly destroyed in places, and as often re-built. An ordinary degree of sagacity and common sense should have suggested the folly of locating such roads originally so low as to be subject to such casualities, and certainly the repeated ocular evidence of the error committed by the pioneer road surveyor, (for such he must be called, as there was no engineering in the case,) should have deterred the commissioner of highways from re-constructing such roads on the same sites. Many cases of injudicious road construction and waste of public money could be cited, were it necessary, to establish the fact that reform and retrenchment, greater skill and wiser legislation, are needed for the more economical and efficient management of the public roads throughout the country.

As the existing road laws in all the States are generally "unsatisfactory," a recital of many of them in this article is unnecessary. Oscar I. Strong, of Pocohontas county, Iowa, reports the following roads laws in that State: "The board of supervisors has the general supervision of roads in the county, with power to establish or change them as provided by law. The town trustees levy a road tax each year of not less than one mill nor more than three on the dollar of the taxable property in each road district. A road supervisor is elected in each district, who has the supervision of the roads in his district, and it is his duty to keep these roads in as good repair as he can, with the funds at his disposal; it is also his duty to require each able-bodied man between twenty-one and fifty years of age to perform two days' labor on the roads, between April and August of each year. The operation of the law does not give satisfaction. The average amount of work done on our roads does not exceed six dollars per mile per annum. The best road in the county is made of saw-dust."

E. M. Mackemery, of Leavenworth county, Kansas, reports as follows: "All the principal roads in the county are under the supervison and care of a scientific engineer, who is the adviser of the board of county commissioners. The roads are graded, and worked on an established system, and all thoroughly and substantially bridged with blue limestone of superior quality In no State in the Union is there a greater pride, or a more intelligent appreciation of the value, comfort, and pecuniary profit arising from a well-devised system in, and a thorough improvement of all classes of roads. An experience of twenty-nine years in Illinois, Iowa and Missouri has established the conviction that more gratuitous labor is preformed on the roads of Kansas than in any other western State. At a cost of a little less than $250,000 the county has bridged every stream on the principal roads leading from Leavenworth city. The city of Leavenworth has also, at a large expenditure, built all stone bridges, even beyond the city limits, to facilitate trade with the interior. After roads are opened, the annual amount expended per mile does not exceed $250.

Arthur Parks, of San Bernardino county, California, states that "every male citizen in the county, Indians excepted, is taxed one day's work or two dollars per annum, besides which there is a small direct tax. The law is generally enforced, but is not satisfactory, as it is not sufficient to keep one-fourth of the roads in order. Private subscriptions or one hundred dollars each are not rare for mending our ways. The citizens of this county fully indorse the leading paragraph of your circular; and, realizing its correctness, we are determined to take hold with a will and have good highways."

There is great similarity in the systems of taxation for road purposes, it being generally a "poll tax" in labor, varying in the different States from one day to five per annum; and in some portions of the country a money tax, varying from one mill to two cents on the one hundred dollars; and in others a tax for bridge purposes alone, as high as four cents on the one hundred dollars of taxable property. Owing to the abundance and excellence of material in some regions, and the scarcity and inferiority of it in others, there is a difference of at least tenfold in the cost of construction and maintenance of good roads. Good ones are the exceptions in all the States. Those of eastern New York and of New England have generally a surface superior to those of almost any other portion of the country, but the grades are rarely reduced to what they should be. To the steepness of the grades in the line of the axis of the roads in those regions, and to the care in surface drainage, their dryness and smoothness of surface are mainly attributable, as it causes them to shed water rapidly.

The proper mode of construction of a road adapted to a large amount of heavy traffic, at all seasons of the year, depends greatly on local circumstances. The perfection and the durability of a road must, of course, depend on the material used in its construction, all other circumstances being equal. We shall treat the subject in the order in which the earthy and the mineral materials, in the various parts of the country, possess their respective superiority for use in the construction of county roads: First, the macadamized or broken stone road; second, the gravel, or proper admixture of natural pebbles of various sizes with a proper quantity of clay and sand, or loam ; third, rotten rock, of various character ; fourth, rotten rock, artificially mixed with clay ; fifth, loam, in a natural state ; sixth, artificial loam, made by mixing clay and sand ; seventh, clay ; eighth, sand.

THE MACADAMIZED OR BROKEN STONE ROAD.

For the sake of brevity in treating class No. 1, we shall designate the rock to be used by the terms hard and soft. The mode of preparing the foundation of a Macadam road should be modified according to the character of the soil of which it is to be made. It may, however, be premised that one essential condition to be secured in the use of every character of material is that of dryness. This secured, almost every variety of soil will form a suitable substructure for a macadamized road. It would be difficult to furnish specifications for the great variety of cases that may be presented, but we shall endeavor to give such general instructions as will meet all probable cases intelligibly, and will commence with the most difficult circumstances likely to be presented, viz : An extensive plain, level, or nearly so, with a tenacious clay soil.

To effect drainage under such circumstances there are but two modes known to the writer: First, by surface drainage, by the use of open ditches or gutters, excavated on both sides of the road in the manner described. If practicable, the fall should be made both ways, from a point as nearly central as may be, and each gutter be extended to a point of discharge lower than the plane. The advantage of draining both ways is, that with ditches of the same depth at their discharge end, the fall will be doubled. In case the distance is great, and the labor of producing sufficient fall in the ditches is considered too expensive, it will then be judicious to test the practicability of the other method. This consists in what we call pit-drainage. Its practicability can always be ascertained by digging a well, or by boring with a pile or post augur. If a stratum of sand or gravel, which will absorb water, is reached at a reasonable depth, say not more than forty feet, this plan may be adopted. Three or four wells, equally distributed as to distance, will be ample to drain a mile of road. If the wells are to be stoned with rough stones, they should be excavated six feet in diameter, and the depth continued three feet below the surface of the stratum which is found to absorb water. The rough stone wall may be laid dry, but the stones should extend from the inner face to the bank, the smaller ends forming the inner face, thus forming a complete arch of every layer of stones. The wells may all be on one side of the road, or a portion of them on each side, and they should be covered with a strong lattice of cast iron, with meshes about two inches square.

The gutters should fall each way toward the wells, and the low places in the gutters on the other side of the road should be opposite the wells. At each of these low points a well a foot or two in depth should be excavated and stoned up. A tile or a stone drain with good fall should connect the shallow with the deep well. The greater the fall in these cross drains, the smaller may the conduit be, and the less the liability to clog. A slight circular depression should be made in the bottom of the surface gutters around the wells, in which the sediment in the drainage water may be deposited before it flows into the wells. It sometimes occurs that the water, not being carried off rapidly enough, will rise up to, and even above the top of the well; but this is rare, and the foregoing mode will generally provide satisfactory drainage under the circumstances described. When practicable, the surface gutters conveying the water to streams or to ravines may be of more simple and of preferable construction. Where the water is to be conveyed a long distance, say half a mile in one direction, a fall of three inches to one hundred feet will answer. This will require the gutter to be six feet eight inches in depth at the discharge end. The bottom of the gutters must be smooth and graded with accuracy. The angle of the slope of the banks should not exceed thirty-five degrees.

In tenacious clay soils the margin of the surface of the substructure, on which to place a Macadam road-bed, should be at least one foot above the bottom of the gutters. It should be made smooth and solid, and have an underdrain at each margin of the macadamizing from six to twelve inches in depth, and an average of twelve inches in width. These drains may have a fall each way for five to seven rods, to a low point from which a lateral drain should extend under the side road to the gutter into which they are to discharge. The longitudinal underdrains are to be made of broken stones, and are to be filled up to the level of the surface upon which the macadamizing is to rest. The earth banks on each side of the macadamized portion of the road should be twelve inches in height, and be sufficiently sloped to be self-sustaining until the broken stone has been applied, which will render them perfectly secure. The stone should be so broken that all, or nearly all the pieces will pass through a two-inch ring. This is the rule adopted in England, where this kind of road has reached the greatest perfection.

We say "nearly all," for of course there will occasionally be stones which, unless too much time is spent in breaking them, will not come up to the standard. This subject is one of the utmost importance; and if we are to be governed by the opinion of Macadam himself, we find him declaring that cubes of one and a quarter inch are better than any larger; and he affirmed before a committee of the House of Commons, that his experience went to prove that the expense of keeping roads in repair was almost in the exact ratio of the sizes of stone used in each instance. Thus, a road constructed of metal broken down to cubes of one and a quarter inch would require to keep in repair but one-half the outlay necessary for one constructed of cubes of two and a half inches; so that the increased cost of construction in using the smaller broken metal will be fully compensated for by the saving in repairs and greater durability. In speaking of the metal as being in the form of cubes, it is not intended to convey the idea that each piece of stone must be a perfect cube, and all of equal size; practical men will of course understand that the term is figurative, and that the metal must of necessity be more or less irregular, and vary in size considerably. The broken stone for a new road should be applied to the depth of twelve inches and twenty feet in width to produce a first-class road. The lateral slope either way from the centre of the road should correspond with that of the surface of the foundation; this slope should be about one-quarter of one inch to a foot. There should be an earth side track on either side of the macadamized portion of the road. The earth road, when dry and in good order, is more desirable than the Macadam, and materially saves the wear upon it. The foregoing specification, although referring more particularly to a road nearly level longitudinally, is equally applicable as a direction for macadamizing any road of the width mentioned.

The preparation and application of broken stone in road-making have hitherto been very expensive, thus presenting great discouragement to those desiring to improve roads upon this system, which we have no hesitation in pronouncing the best of all things considered, as yet discovered. The cost, however, has of late been greatly reduced by the introduction of the "Blake Stone-Breaker," a machine of immense strength and efficiency, which has been satisfactorily tested in practical use. Thirty perches (twenty-five cubic feet to a perch) of the hardest trap boulders can be broken into the best road metal in ten hours by this machine. It requires about nine horse power to perform this amount of work in the time given. In a single hour it has been known to break four perches, or one hundred cubic feet, of stone of the foregoing character. With this machine the cost of breaking is reduced to thirty cents per perch, using coal at $5 50 per ton, and labor at $1 50 per diem, and an engineer at $2 50 per diem, who assists the two laborers employed in feeding the machine. The average day's work for a good hand in the spring, summer or autumn is less than one perch, and in winter still less. The average price of such labor is about $1 50 per day at present, so that the reduction of expense by the use of the machine is not less than eighty per cent.

The stone-breaker referred to has elevaters connected with it, which carry the stones to a considerable height above the machine, where they are deposited upon a sieve, through which the fine sand produced in breaking the stone passes, and is deposited by means of a chute in a tight compartment on the ground; while the stones running over the sieve are deposited in a kind of hopper, from which they are loaded upon wagons or carts by simply opening a slide or trap. In this manner the cost of loading is reduced to a nominal figure, being done almost instantaneously; while, if done by hand by shoveling from the heap, the cost of loading would be nearly half as much as breaking.

After what has been said with regard to the sand being carried down through a chute into a tight compartment, we will explain why the trouble is taken to separate the sand from the broken stones at all, or care taken to deposit it in a tight compartment. It was found that this sand, produced by the trituration of stones of this quality in the process of breaking, is the very best material yet discovered for manufacturing "concrete stone" under the Ransom patent of England, which is rapidly coming into use in this country. About one hundred pounds of sand are made for each perch of stones broken, and all yet made by the machine in question has found ready sale to the "Ransom Concrete Stone Company of Maryland," at one cent per pound. It will be seen that in the neighborhood of cities, where the concrete stone is being manufactured to any considerable extent, a road may be macadamized at a very low cost, if indeed it is not found that the stones can be broken and applied at a cost which shall be less than the proceeds of the sale of sand produced from the amount of broken stone required, thus preparing the road metal free of cost, and leaving a profit to the constructors besides.

In the application of the broken stones to form a road-bed, although the process is simple, it is important that the surface of the earth substructure be kept free from ruts and tracks, as any depressions will fill with water, and soften the foundation at these points, thus causing the road to settle unevenly. Depressions in the stoned surface cannot be well prepared without "picking up" the metal to the depth of several inches. The material used in repair should be somewhat smaller or finer than that of which the road is formed. The portion repaired is to be thoroughly rammed with a "paver's rammer," and, when finished, should be slightly above the surface around it, which remains undisturbed. When the metal has been properly graded on a new road, the surface should have slight dressing of clay, and a heavy roller should be passed over it until the metal comes to its bearing, before vehicles are allowed to pass over it. A road-bed twenty feet in width and twelve inches in thickness will require 4,224 perches of broken stone to the mile. The surface grade of the earth side tracks should correspond with, and be a continuation of, the grade of the macadamized portion. The side tracks should not be more than nine feet in width, as unnecessary width increases the difficulty of surface drainage.

Many professional road makers will take exception to the clay surface dressing, but it has been thoroughly tested in practice, and always with success. The effect is to bring the metal to a bearing at once, and to prevent the action of the wheels from destroying the angularity of the surface metal, a very important quality, as it is almost impossible, after the surface stones have become rounded, to get them to bind one with another, and form a first-class road surface. The quantity of clay applied should be sufficient only to fill the interstices between the stones, on the immediate surface, when the metal has come to its bearing. Another advantage of such an application is to render the superstructure of macadamizing waterproof, almost from the first, the importance of which, in assisting to maintain a dry foundation, is almost self-evident.

THE GRAVEL AND OTHER ROAD-BEDS.

Where the natural soil of a road consists of gravel of proper texture, in its natural state, the process of producing a very desirable road, for all except very heavy traffic, is simple and inexpensive. It only requires to have the surface of the road-bed raised by repeated plowings, the furrows all being turned toward the centre of the road. In case the natural surface has a slope to one side, the execution can still be mainly and most economically performed by the use of the plow, by turning the furrows in one direction. The plow should be what is called the "double right and left-hand plow," which may be used with great advantage. When the desired grade of the surface of the road and gutters shall have been produced, as nearly as practicable, by the use of the plow, it should then receive repeated harrowings. The remainder of the work may be most economically and efficiently performed by means of the grading machine, except the removal of considerable hills, or the filling of corresponding depressions, which, if the distance is short, may be best performed by the use of the common scraper; but, if it exceeds five or six rods, wheelbarrows, carts, or dump-wagons will be necessary. No hand grading is necessary, as the grader, propelled by a pair of active horses, will perform more of this character of work than fifty men, and at the same time do it better.

The width of such gravel road will, of course, be controlled by circumstances, the amount of travel and the character of it being the most important considerations. It may be remarked, however—and it is equally applicable to all roads, of whatever material—that they should not be made wider than is really necessary, otherwise the cost is greatly increased, as well as the difficulty of surface drainage, which, as was remarked in connection with Macadam road, is of great importance. A road constructed of natural gravel, and having a gravel sub-soil, will require to be raised less in the centre, and the side gutters may be made more shallow than would be admissible with any other material.

Rotten rock.—This material is frequently found, in a natural state, quite well adapted to forming a road that will serve all the purposes for which earth and gravel roads are adapted. It rarely has a proper degree of tenacity, however, to enable it to bind, or retain desirable compactness.

Where this material lacks tenacity, the defect is easily corrected by adding a due proportion of clay, but the proper proportion of each can be ascertained only by experiment. When prepared as they should be, a good road for ordinary country travel can be made from these substances.

Loam.—By the term loam, we mean clay with an admixture of fine sand, and generally a liberal proportion of vegetable matter.

When the proportions of clay and sand are such that the soil will not bake, nor incrust when dry, nor become very adhesive when wet, it may properly be called loam. When the soil of a road-bed consists of loam, or the best soil obtainable, the directions for the use of clay are applicable, with the exception that loam does not require the extreme degree of surface slope recommended for clay.

The natural soil of the bed may be either clay or sand. The application of the other by hauling it on to the bed and incorporating it by means of the plow and harrow, will enable the engineer to produce from these two materials (each illy adapted alone) an artificial soil, which will answer the purposes of a road-bed quite satisfactorily. Gravel, consisting of water-worn pebbles, without an admixture of clay by which to cement them, is a poor road material, as it rolls from under the feet of the animals and from beneath the wheels, making the labor of teams on such a road very severe. A proper amount of clay added to, and well mixed with gravel, will greatly improve it as road material. The characteristics of all these materials are so various in different localities, that the proportions need to be modified according to circumstances; and the proper proportions in each respective case will be most readily and satisfactorily determined by experimenting with a number of samples, say a cart load of each, in different proportions, which should be carefully noted, all being placed contiguously on the road-bed, where they will be equally exposed to wet and to use. A few months' experience, under such test of the various mixtures, will give the road maker data which theory cannot furnish.

In some sections of great area, no other material than clay can be obtained; hence it must be used as road material in its natural state. The general principles involved in the construction of gravel, loam, and other roads, and described under those heads, are to be observed in constructing a road exclusively of clay; the gutters, however, should be made as deep as is practicable, and the road-bed as narrow as the travel will admit, and be as highly crowned as is admissible, thus guarding against absorption of water from the gutters, and effectually shedding the rain-fall from the bed.

There is no material in the catalogue treated that forms so perfect and delightful a road for pleasure-driving as clay, when in a certain condition; but it is so difficult to be maintained in the desired state, that it is judicious to incorporate sand or gravel with it, wherever practicable.

There are districts of country many miles in extent, where nothing but drifting sand can be obtained for making roads. Where the depth of the sand is great before reaching a tenacious sub-soil, a road-bed of sand will be more compact and better, if made lower than the surface of the land on either margin, so that water may flow on to, instead of being drained off from the road. Like clay, pure sand is not a desirable road material, and quicksands, not unfrequently found in extensive sandy regions, are dangerous. Where drainage of quicksands is impracticable, two thicknesses of planking laid over the place to be crossed, the lower planks running in the direction of the road, and the upper ones across it, have been found to answer very well as a sort of a floating road. A contractor on the Knox and Lincoln railroad, in Maine, has recently encountered a quicksand, into which he has sunk pile upon pile to the depth of one hundred and forty feet, and no indications of a hard sub-stratum are yet apparent.

PLANK ROADS.

Plank roads have been so universally unsatisfactory, that valuable space need not be occupied with directions for their construction.

I. A. Lewis, of Howard county, Missouri, says that a plank road was constructed in that county, twenty-six miles in length, costing $100,000; but it has long since been abandoned. Numerous instances may be cited of their failure, from all parts of the country, but not one in which they have been a success. A plank road is a good road when in proper condition, and may be a necessary kind in some districts of the country; hence it may be well to state that it is claimed that, by steaming the plank, and charging them with creosote, costing about eight dollars per thousand feet, board measure, their durability will be doubled.

THE LONGITUDINAL GRADE FOR A ROAD.

There is perhaps no branch of the subject under consideration which demands more attention by the engineer, than that of the reduction of road grades to the minimum under all practicable circumstances. We can better afford to increase the length of a road considerably, than to retain grades, in places, so heavy that a team is unable to haul more than half, or perhaps one-quarter the load it can on all the remainder of it. Roads which are steep in the line of their axis are not only more severe on teams, but they are dangerous, and much more expensive to keep in repair. Various opinions have been expressed by engineers and essayists on this subject.

Mr. H. F. French, of Boston, Massachusetts, in a very able paper on roads, contained in the report of this department for 1866, says: "In view of every consideration, except drainage, the level line is probably the best; but, as drainage is essential, and, as will be seen when we come to consider the construction of roads, it is desirable to make them as flat as possible transversely, a slight slope in the length of them is found expedient. This slope should be one in two hundred, which is sufficient for drainage without injury by washing, and adds little to the draught."

A grade of one in two hundred is a very desirable one, so far as draught is concerned, but it is nearer level than is practicable on any considerable proportion of our country roads; and, as regards drainage, it will be of little service. Much lateral slope is objectionable, but we do not consider that a slope of one-quarter of an inch to one foot is so, while it is sufficient to provide lateral drainage, which is more efficient than longitudinal drainage. The widest track of country wagons does not exceed five feet, and with a slope of one-quarter of an inch to one foot, the difference in the height of the wheels when the vehicle is on the side of the road, is but one and a quarter inch, and this is reversed in returning. It often occurs in rural districts, that it is practicable to drive a large proportion of the distance on the summit of the road bed, where the vehicle will be on a level. It is next to impossible to prevent road surfaces from rutting to some extent, and a "slope of one in two hundred" only, while it is so gentle that there will be no tendency to wash, will certainly keep surface water on the road-bed so long that much of it will be absorbed, which may be avoided in lateral drainage, without injury to vehicles, displacement of lading, or inconvenience to passengers. It is not practicable to give a rule for the exact amount of longitudinal grade of roads, as they are affected by so many circumstances. Primarily the best provision for business traffic should be considered paramount to all else, yet this has often to be modified by local circumstances, whether in re-grading old roads or in locating new ones. In the latter, if the locality is mainly unsettled, and the probabilities are that the building sites will be most popular near the summits along the line of the projected road, the engineer should prospect contiguous lands, and so modify the route that the necessary laterals may connect with the road by grades that shall be easy, safe and inexpensive.

There has been a very general and striking change in the taste evinced in locating rural homes, country seats and farm buildings of late, to provide for which a corresponding change in the roads by which they are to be reached has become indispensable. Formerly, the popular site for rural buildings was under the lee of elevated ranges of land, near the streams, or springs at the base of hills, to accommodate which the public roads generally traversed the banks of streams, in which position the drainage of all the high lands must pass under or over them. The advantages of the modern system are numerous, and the disadvantages few. The salubrity of the high sites, the more extensive and pleasant view secured from the buildings, as well as from the summit or the hill-side road by which the buildings are reached, the reduction of cost of construction and maintenance of such roads, the superiority of the grade generally obtainable, as compared with those along the streams, and the greater feasibility of securing dryness about the buildings, as well as of beautifying the landscape in their vicinity, are among the most prominent advantages of the modern selections over the primitive. Some have urged as objections to the high sites, that they are bleak and cold, and that water is not convenient. The former objection is fully met in the modern approved methods of building, and of economically generating and circulating heat; while, by the use of improved hydraulic apparatus, the supply of water is made ample, and luxuries unknown in the old system are fully enjoyed.

Where objectionable grades, say of ten feet to one hundred, the heaviest that should ever be tolerated, are unavoidable, the following instructions for construction and repair should be observed: Avoid short curves in the road; make the bed wider on the hills than on the plains, and especially in the curves. If the road runs along the side of a slope, grade the surface of the bed, so that all water falling on it shall be cast to the gutter on the upper side, as there is great danger of accident in icy times, if any portion of the bed has a lateral slope with the hill-side. On such road provide low water bars across the road at intervals of thirty to forty feet. These bars should be placed obliquely, and should discharge all the water in the gutter on the upper side. If the gutter is disposed to wash, it should be paved, and the curb of the pavement on the road side set so low that water from the road-bed may flow into the gutter the entire distance from bar to bar, instead of being required, as is frequently the case, to flow in the ruts of the road-bed until it reaches the bar, which it often overflows and washes away, continuing to flow on the road until dangerous gullies are cut, requiring much expense to repair them. If the hill is long, say one-fourth to half a mile, the water should be carried across the road in culverts, one hundred to one hundred and fifty feet apart. The best and cheapest common road culvert may be made of hard-burned terra cotta pipes. On hilly roads they are rarely required of more than eight to ten inches calibre. These pipes need no sleeves or bells, nor any cementing of the joints; and are less expensive than the common stone culvert, even where the stones are at hand. The capacity of the pipes, owing to the smoothness of their interior surface, is much greater than that of a stone culvert of the same area of cross section. The pipes should be burned like hard, red brick, and are then as durable as granite The pipe culvert should receive the water from a shallow well, walled up with stones or bricks. This well should be in the line of the gutter on the upper side of the road. The water from the gutter should fall into the well over a flag on the wall of the well, and between two side walls, carried up with the other walls to a height sufficient for a proper opening, when the well and the opening in the upper side should be covered with a strong flag. This flag should overlap the inner face of the wall of the well at the opening, at least one foot, that animals may not step into the well. This arrangement makes the upper end of the culvert sightly, secure, and free from all dangerous effects. The trench in which the pipes are laid should have a fall, so that the water from the culvert may be discharged upon a natural surface, as it will be less liable to gully it than an artificial bank.

STONES ON EARTH AND GRAVEL ROADS.

In preparing earth and gravel road-beds, all small stones, down to half the size of a hen's egg, should be removed from the surface soil, as the tendency is for them constantly to work up to the surface, where they are injurious to the feet of the horses, and to vehicles, wear and break the lading, and destroy the road. The wheel of a loaded vehicle, falling from a stone over which it has rolled, even if it is not more than two inches in height, will injure a road surface more than the natural rolling wear on a smooth surface in running a mile. The same may be said of the effect of loose stones on a macadamized road, only that the damage to the latter is more serious than to the earth-road surfaces, which will in some degree repair themselves; but the displaced, macadamizing material is strewed upon the surface of the road, greatly increasing the evil. Next in importance to drainage is the removal of loose stones from the surface of the road, and the best and cheapest mode in thus clearing earth and gravel roads is to run the rut scraper or grader over the road, commencing at each margin with the scraper so set that the surplus earth, stones, &c., will be continually deposited toward the centre of the road. Having passed the scraper over the entire surface, by passing up one side and down the other, all the small stones to be removed will be deposited in a narrow row on the middle of the road-bed, from which they may be rapidly gathered by the use of the malleable cast-iron coal scoop, which being latticed allows the earth and gravel to fall through. Loose stones may thus be removed from the surface of earth and gravel roads at perhaps one-tenth the cost of hand-picking, and all ruts filled at the same time. The loose stones on macadamized roads should be frequently picked off, and the side tracks kept in order by the use of the grader, as above described.

Great advantage and economy result from passing the rut scraper over earth and gravel roads as soon after every rain-fall as the soil becomes dry enough to flow before the scraper, and readily fall into the ruts and depressions in the road surface. Where water is allowed to stand until evaporated from the ruts, large and frequently dangerous mud-holes are the consequence; and as they are generally repaired by casting in stones, small and large, the road is made worse, instead of better. Mud-holes in roads are striking examples of a verification of the adage that "prevention is better than cure;" and prevention can be effected in the most simple and economical manner, by the use of the rut-scraper. If taken in time, it is rarely necessary to haul soil for repairs, that removed by the scraper from the margins of the ruts generally being all that is requisite to raise the depressions to the proper grade.

The objectionable course of conveying surface water across roads on the surface, instead of by the use of a proper culvert, is common in all parts of the country, even on macadamized roads charging heavy tolls. The damage annually done to teams in such cases is more than the cost of a culvert. These water crossings are often, in winter, a sheet of ice ten to twenty feet in length and as wide as the road, in crossing which teams are often seriously injured by slipping.

WATER FOR TEAMS.

It is a matter of so great importance that a full supply of water by the roadside be provided for teams, at intervals of at least an average of five miles, that the subject should no longer be neglected, but a provision for securing a supply should be made in the county road laws. Except in very flat dry countries, it is generally practicable at trifling cost to arrange water troughs at proper intervals, so that water will flow in and out perpetually. The supply-pipe should always be inserted into the bottom of the trough, and not rise much above the surface of the water when the trough is full; for, if it does, the water is apt to be blown about and to freeze, so as to make the approach to the trough dangerous. If the water is received at the bottom of the trough, and the overflow is taken from near the supply, in a pipe to a culvert, there will be no ice about the trough.—The supply-pipe should rise about half an inch above the level of the water in the trough, so as to form a drinking fountain for teamsters and travelers. In the heat of summer, teams will instinctively hurry their pace as they approach these grateful, thirst-slaking stations, and their comfort will be promoted to a degree that will well compensate for the outlay. The temperature of water standing in a trough exposed to the sun is more wholesome for working teams than that from cold wells.

WATER BARS.

The purpose of the bar is to cast the surface water from the road to the side or sides before it has accumulated in such amount as to cut the ruts into gullies. When the surface of the road has a slope to both sides, the bars should be placed opposite each other in the form of an obtuse V. The bottom of the V should be up the grade. There should be no gutter excavated in the road surface on the upper side of the bars, but the bar should be raised slightly above the road surface. No stones or timbers should be used in the bars; good gravel, where obtainable, is the best material. If the bars are placed as near each other as they should be on the heavy grades, the highest portion of the bars, that is, at the margins of the road, need not be more than three inches above the level of the surface of the road. On newly constructed roads, whether of broken stone, earth, or gravel, the water bars need frequent and particular attention until they become firm; in fact there is no portion of the road that will give a better return for the required outlay of labor than the water bars.

SHELL ROADS.

A pleasant and durable road for ordinary light country travel may be made on a properly drained foundation, by applying shells to the depth of about eight inches, with a lateral surface grade of a quarter of an inch to the foot, but not sufficiently durable to be profitable for heavy traffic. A few years since, one of the main macadamized turnpikes leading out of Baltimore was repaired over a section of about half a mile in length, by dressing the stoned road with shells, applied about six inches in thickness. The solid bed of stones underneath and the heavy traffic on the surface soon ground the shells to powder, and when wet it became a bed of thin lime mortar, two to four inches in depth, which was so objectionable that the company were obliged to scrape up and haul off the whole mass in less than two years after the shells were applied. The circumstances described were particularly unfavorable for shells, as a test of their durability. The wear upon an ordinary carriage road in private grounds is not usually sufficient to reduce the shells to a good road in many years; hence they are not adapted for that use. A shell surface is inclined to rut, and work to the margins, and the shells are very difficult to move so as to repair the road by any hand process; while by the use of the grader, they may be readily and rapidly leveled in the construction of a new road, or re-graded when displaced by wear. An active man with a pair of horses, with this implement, will repair two or three miles of shell road in a day, which would require the labor of at least seventy-five men to perform in the same time.

ROAD GUTTERS.

So much depends on the proper condition of the side gutters for the thorough maintenance and protection of the road, that the writer has been induced to give this branch of the subject special attention, and to test a variety of plans, in the hope of arriving at valuable and permanent improvement. Having realized his fullest hopes in one direction, a detailed description of the aim and its results may be given. Finding that the gutters, from the perpetual moisture maintained in them, were inclined to clog with rank, aquatic grasses, he sought to devise a plan to prevent the difficulty. The course pursued was to pave the gutters with boulders, set in about eight inches of washed gravel, and when they were all rammed in place, the gravel was swept from the interstices between the stones to the depth of one inch, and its place supplied with heated, clean sand, which was saturated as it was applied, with a hot mixture of coal-tar and coal-tar pitch, two parts of the former and one of the latter, filling the interstices level with the surface of the pavement, producing a smooth, uniform surface. The first experiment was made about twelve years ago, and has proved a perfect success, the effect being to prevent the growth of all vegetation, while the surface being smooth prevents any clogging with leaves, dead wood and the like. Another valuable result attained was that the pavement, being made water-proof, is hardly affected at all by frost, keeping its place much better than when the stones are set in gravel alone, in the ordinary manner. This concrete dressing is not adapted to use in gutters where vehicles are allowed to run over it, particularly in cold weather; but it is admirably adapted to use in side gutters for country roads, and is greatly superior to any other gutter for carriage roads and walks in private grounds. The cost is about two cents per superficial foot more than the ordinary stone-paved gutter.

COUNTRY ROAD ENGINEERING.

Road engineering as a profession has not been sufficiently in demand in this country hitherto, to enlist the attention of those possessing experience, skill and a thorough, scientific knowledge of the subject. The engineering of new roads and the alteration of old ones have generally been done by a land surveyor, or some student in railroad engineering, each deficient in a knowledge of the important work he attempts to execute; hence the defective character of most of these roads throughout the country. Not until the professional engineer shall receive greater encouragement to make common road engineering, in all its details, more a speciality, will it be more skillfully executed, and this encouragement will not be afforded until the masses are made more familiar with the importance of the subject.

There is one important principle in road engineering that should always control the grade of a road as far as practicable, and yet it is observed and acted upon only as the exception instead of the rule. It is that when a road is to connect two points, whether terminal or intermediate, and one is higher than the other, the inclination of the road should, if practicable, continually tend upward in one direction, and the reverse in the opposite. Instead of this we have examples all over the country where there is a descent, a fall in the grade, made up of a number of smaller or larger hills, from the low to the high point, that is really greater than the actual elevation of the high above the low point. A trifling divergence in the direction of the road, and frequently with but a slight increase in its length, if any, will almost always remedy this great defect; so that a team, in traversing the road from the low to the high point, shall have but little, if anything, more than the real difference in the altitude of the two points to overcome. This error, if corrected in all existing cases in this country, would be of incalculable advantage to the community.

WIDTH BETWEEN FENCES.

It is important that the width of a road between fences should be ample to provide the material required in construction and repair, without endangering the fences by undermining the banks, and also to leave a grade that will be self-sustaining. Greater width is necessary in snowy districts than in those not subject to blockade from this cause. In the northern portions of this country there are districts where the cost of keeping roads open in the winter exceeds that of repairs in summer. Increasing the width between the fences and keeping the gutters suitable for the use of sleighs have proved to be the most efficient remedy. The width required by law varies in the different States from two to four rods. In the opinion of the writer the latter width is not too great to be economical for highways generally. Walls, close fences or close belts of trees, on road margins, are also objectionable, as they tend to blockade them with snow, and prevent the surface from drying.

SHADE FOR ROADS.

On all earth roads shade is objectionable in its effects on the surface, yet it is admissible to provide a good shade with deciduous trees on the summits, where the fullest benefit of the fanning breeze may be enjoyed, and shade will be least injurious. The effect of shade on stoned roads is less injurious than on those of earth. Abrupt banks or dense thickets on the south side of a road-bed, so high and near as to exclude the sun from it in winter, are very objectionable and dangerous, as such portions of the road are generally icy, when the remainder is free.

EXISTING ROAD LAWS.

There is a great similarity in the general road laws of the different States pertaining to the maintenance of country roads, the tax being generally a poll-tax on the male inhabitants between certain ages, though in some there is a trifling levy in money. The levy for the cost of new roads and bridges is usually in money, on all the taxable property in the rural districts. The system of labor-tax and of selecting road supervisors alternately throughout the districts, to direct the outlay of such tax, regardless of qualification or fitness for the work, notwithstanding it has so long and generally prevailed, is everywhere acknowledged to be very defective and unprofitable in its results.

PROPOSED SYSTEM.

All money required to construct and maintain the roads and bridges in each county should be raised by levying a tax in money. A competent county road engineer should be permanently employed, who should have the entire direction of all construction and repairs of roads and bridges in his district, with the power to draw on the treasury for the necessary means to meet all reasonable requirements in defraying the cost of the work to be executed. He should be authorized to purchase all teams, vehicles and implements required, the same to be the property of the county, and to employ as many competent foremen as required for his district. They should have charge of these teams, &c., and have power to employ, control and discharge the number of laborers directed to be employed by the engineer. The foremen should each have their respective districts allotted them to be kept in repair. The engineer and his foremen and the laborers employed should be required to devote their entire time to labor on the roads. The water. bars, culverts, bridges and gutters should be examined as often as once a week, and all loose stones and other surface obstructions removed. Work for repair of surfaces should be constantly pursued, and the principal amount of material required on the earth roads should be applied in the dry season. The winter should be devoted to quarrying stones for bridges, culverts and macadamizing, and in raising and hauling gravel, and depositing it where it may be readily applied at the proper season. With such a force in charge of the roads, the amount and quality of work executed would be more than double, and the actual tax required less than under the prevailing system.

COST OF ROADS AND EXPENSES OF REPAIRS.

According to all the returns from different States, the average cost of construction of gravel roads is $2,241 per mile, and the average annual cost per mile for repairs is $103. It appears from the reports that only a very few of the roads are improved by a gravel bed, and neither the width of the beds so improved, nor the quantity of material applied, is given. We may reasonably infer, however, that neither is greater than is absolutely required, and yet we find the cost of construction per mile to range from $700 to $4,000, and to average $2,241. The annual outlay per mile varies from $4 to $200, the average being as above stated, $103.

By reference to the table showing the cost of repairs to common roads per mile throughout the country, we find it to vary from $1 to $59, and the general average is $18 11 per mile.

The returns show that the average cost of construction of macadamized roads per mile is $3,290, and it varies in the different States from $500 to $6,336. The average annual cost per mile for repairs of macadamized roads, as reported, is $40, varying from $10 to $100 per mile.

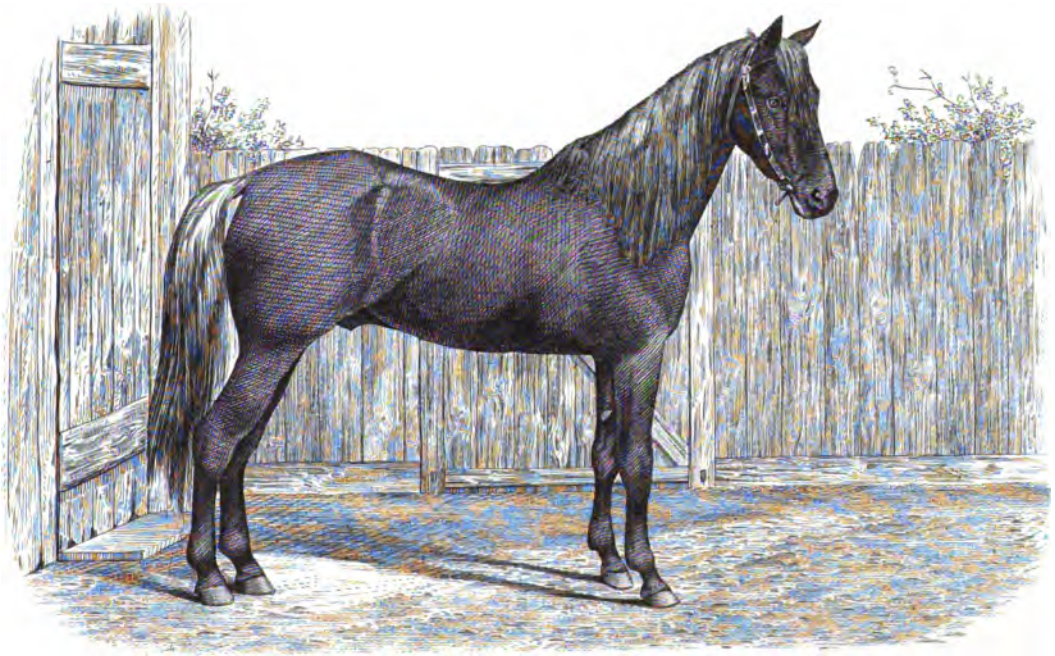
The average cost of construction of plank roads per mile is reported to be $3,000, and the average annual cost of repairs per mile is $550.

The following table, compiled from replies to circular issued by the department, shows the average annual cost per mile of repairs of common roads in the respective States:

State.	Cost p. mile.	State.	Cost p. mile.
New York	$21 82	Louisiana	$2 00
New Jersey	27 50	Texas	7 95
Massachusetts	59 16	Arkansas	6 43
Rhode Island	33 75	Tennessee	17 00
Michigan	23 60	West Virginia	8 40
Wisconsin	24 70	Kentucky	13 57
Pennsylvania	18 28	Missouri	10 59
Maine	40 00	Illinois	10 31
Connecticut	9 00	Indiana	38 28
New Hampshire	16 00	Ohio	23 60
Vermont	25 00	Minnesota	20 00
Maryland	11 00	Iowa	20 00
Delaware	14 50	Kansas	8 00
Virginia	6 00	Nebraska	5 00
North Carolina	6 50	Utah	43 00
South Carolina	1 00	Colorado	... ...
Georgia	7 53	California	23 00
Florida	18 00	Nevada	10 00
Alabama	4 84	Oregon	25 00
Mississippi	8 00		

BRIDGES.

The writer has observed in various parts of the country common errors in bridge construction, which he proposes to notice, with remedial suggestions. At the present comparative prices of wood, stone and iron in all districts, except perhaps on extensive prairies, where the former two are very scarce, wood and stone are considered so much cheaper than iron that they are generally used. Where good quarry stones, and suitable sand and lime or cement, are conveniently attainable, the span required not more than thirty feet, rock foundations for the abutments within reasonable depth, and the banks of a proper height, the stone arch with stone parapets is, perhaps, as economical a structure as can be adopted. Where greater spans are required, and the banks are low, stone abutments and well constructed



FAMILY HORSE,
"GRANT"
Owned by John A. Smull, Esq. Harrisburg Pa.

B Singerly Lith. Pittsb.

frame-covered bridges are preferable. Not a doubt exists of the economy of siding and roofing wooden bridges, and of extending both over the abutments, so as to effectually protect from rain the timbers and planking at these points, as they are known to decay first when not protected. There is a frame-covered bridge in Harford county, Maryland, which was built more than fifty years since, and is still safe.

Among the errors in bridge construction, those most common are the injudicious distribution of material, particularly of timber; the contraction of the water way, so as to expose the superstructure to liability to be swept from the abutments; neglecting to bolt the superstructure to the abutments; laying the flooring with close joints, instead of with proper openings, to prevent water from standing on the floors; using perishable varieties of timber, and even allowing the sap-wood to be used in part, by which all is reduced to its ephemeral character. No error is perhaps more common, and none results in so needless and speedy destruction of the longitudinal timbers of bridges, as the want of attention to keeping them dry where they rest on the abutments, and especially at the ends, where they support the earth-filling of the road-bed.

The durability of the timbers may be increased by introducing a light back sill and short light joist about two feet in length, with a plank on edge resting against them, to support the filling independent of the main, horizontal timbers, that air may circulate around the ends; and by covering the ends of all timbers resting on abutments and piers with several thickness of tarred paper, these being the points where decay often destroys when the other parts are unaffected.

PISCICULTURE.

BY AN AMATUER.

Pisciculture is attracting the attention of many of the best minds in this country. The eastern States are far in advance of this State, in their exertions and efforts to stock their rivers and streams with fish of all kinds.

The Connecticut river has, within the past three years, been stocked with shad, and where five years ago but few, if any, were caught, the fishermen now reap a rich harvest with one haul of their seine.

The Fish Commissioners of New York, Horatio Seymour, R. B. Roosvelt, and Seth Green, (well known citizens,) have, by judicious enactments of the Legislature for the protection of young fish, and by the aid of sufficient appropriations towards that object, succeeded in stocking the various streams of that State with all the desirable kinds of fish. These gentlemen now advertise to furnish, free of cost, to any responsible party, the impregnated ova of any kind of fish, provided they will place the same in some public stream, and are not used for private waters, but where they will benefit the public.

The time has arrived when it becomes the duty of the Legislature of this State to pass a law, which will protect the young fish from being destroyed by fish dams, baskets and other contrivances that are now in use, and gradually depleting our streams. Such rivers as the Susquehanna, Schuylkill, Delaware, Allegheny, Monongahela, Juniata and many other streams, which reach almost every section of the State, should be literally alive with fish of all kinds, such as salmon, perch, bass, rock, &c.

Fish culture is a success beyond a doubt, and it only remains for the public to be educated to this important fact, then they will demand of the Legislature the passage of such laws as will protect the young fish; the appointment of commissioners, to be selected from amongst our best citizens, together with an appropriation of money to carry out to the fullest extent, the stocking of all our streams, thus furnishing cheap food in the shape of fish for all our citizens. It has been proven by experiment and careful observation, that not more than one fish in five hundred arrives at maturity, when spawned and raised in the streams without any protection. This may appear to some strange, but the statement can be proven; while by artificial means, from eighty to ninety per cent. of the eggs can be hatched, and the fish raised and placed in the stream.

It is not the intention to enter into a discussion of this important subject, to prove the great benefit which would follow the appropriation of money, and the enactment of the necessary laws, but to give the result of some observations and experience in the hatching of trout.

Trout raising is that branch of fish culture most generally pursued at the present time. There are several reasons for this—it is best understood—one of the easiest to practice, and this variety bring the highest price.

The most important point in the propagation of trout, and one that must be looked to first, is the quantity and temperature of the water; with a good spring of water it is easy to raise a few trout; but to raise a large number, requires care in the selection of a location—the larger the number of trout to be raised, the greater the amount of water necessary. Ponds should be so selected as to have as little surface water or drainage running in them as possible, and the nearer they are to the spring head of the stream the better. Spring water is absolutely necessary for hatching purposes. It is well to locate the ponds so as to have from two to four feet of fall; this fall äerates the water and makes it as good as new, if the supply of water is limited; but if there is plenty of water, this removes the necessity of a fall. The water used for hatching purposes should have a head of at least three feet, so as to allow the hatching boxes to be elevated from two and a-half to three feet above the floor of the hatching house; this will be found to relieve the operator very much. If the boxes are placed on the floor the stooping posture required in examining the eggs, &c., will be found tiresome, and if possible, this should be avoided.

There should be three ponds of a pear shape; the first connecting with the hatching house, for the young trout that are taken out of the boxes; the second pond should have an additional supply of water if possible; this is used for trout from one to two years old; the third pond for all trout over two years old. The ponds should be connected by a race-way from four to eight feet wide, and from twenty to forty feet long, and six inches deep. This race-way is necessary for the purpose of spawning, and serves as a resort for the fish at all seasons of the year. Here the fish will go to free themselves from parasites, which often trouble them; the race-way should be filled with gravel, and the bottom of the pond made to slope gently up to the race-way.

If ponds can be made of clayey soil then it will not be necessary to line them, but when the soil will not hold water, then the bottom and sides can be made of plank or boards, or walled up with stone; but if morter is used, let it dry thoroughly before letting the water in, and the water should be allowed to pass through it two or three weeks, in order to purify it, before the fish are put in. The first pond, for the young trout, if the supply of water is sufficient, should be from fifteen to twenty-five feet long, and from eight to twelve feet broad; six inches deep at the upper end and two feet at the lower end. At the end should be placed a screen of about twelve meshes to the inch, which will prevent them from going into the next pond. Immediately after this, if there is plenty of water, the additional water should tap the race-way connecting the first and second ponds, which should be about thirty feet long. The second pond should be larger than the first and about four feet deep at the lower end. This, also, has a screen at the lower end, of about six meshes to the inch; then follows the race-way connecting second and third ponds, forty feet long. This third pond should be from forty to fifty feet long and from ten to fifteen feet broad, and from five to six feet deep at the lower end, with a screen of four meshes to the inch at that end.

It is better to have small ponds and have them deep, where the supply of water is limited, because the rays of the sun in summer will reduce the temperature, while in the winter the cold weather might freeze the surface.

The screens can be made of galvanized iron, which is the best, or of common wire, painted. By inclining the screens at an angle of 45°, (the top farthest down the stream,) more surface is given for the water to pass through. The sockets should be made so that the screens fit tightly and yet be easily taken out.

The amount of water required for a given number of trout has never been fully ascertained, much depending upon the temperature of the water. A four-inch pipe, with the temperature at from 45° to 48°, will turn out one thousand large trout every year. Seth Green, who from his long experience may be considered the best authority in this country, says:

"The supply of water for a given number of trout has never yet been accurately determined, and I do not know that any general rule can be given applicable to all times and places, because the supply of water required depends very much on the temperature; a certain quantity of water in cold weather sustaining many more trout in good condition than the same quantity in hot weather. It is the same with trout as with mankind. If many people are packed together in a close room they will soon begin to suffer, but will not feel the bad effects as soon in cold weather as in warm. Now, the water contains the air upon which the trout lives, and the supply for any given number depends also upon the amount of air which is in the water. A still, smooth flowing stream, with little vegetation in it, contains the best amount of air; hence, the value of a fall of water between the ponds of the supply is small. The larger the supply of water the better for the trout; and the trout breeder on a large scale will find better success with small ponds and large supply than in any other way. For ten thousand fish the water supply should not be less than seven inches square, (that is forty-nine square inches,) and would be still better if it was seventy-five square inches. A less supply will perhaps do. A supply of water filling a pipe five inches square, (making twenty-five square inches,) for the size of the pond above referred to, will sustain five thousand fish in the second and two thousand in the third pond. The first pond made, to receive six or eight thousand young fish, need not have more than two or three square inches of water." Thaddeus Norris says: "Owen Desh, of Hellerstown, Pa., has a spring in his garden, the temperature of which we will suppose to be 51°, and the volume one and a half inches square; it flows through a trough about twenty-four feet long and two feet wide, at a depth of eighteen inches, which gives seventy-two cubic feet of water. His usual supply of trout in it is or was eight hundred, although at times he has kept twelve hundred, varying is size from nine to thirteen inches, which gives about ten trout to the cubic foot." As suggested before, the hatching house should be located over or at the head of the first pond, and if possible with a three to four feet fall of water for hatching purposes, so as to elevate the boxes.

A hatching house 20 by 30 feet, will contain 12 boxes, 16 feet long by

15 inches wide each; these boxes will hatch from 150,000 to 200,000 eggs, and even more if required, but as the young fish increase in size, they will have to be taken out of the boxes and placed in the small pond, to give room for those remaining. About five hundred can be raised in each division of the troughs, until they are from three to five months old, when they have to be again thinned out.

The size of the house should be regulated by the supply of water for the ponds. If the amount of water is limited, then there is no necessity for a large house, except where parties wish to sell impregnated spawn. For hatching purposes, spring water is almost indispensable, as few or no brooks are uniformly clear, and however clear the water may appear, it is necessary to filter the water through several pieces of coarse cloth or flannel, before reaching the eggs which are deposited on the gravel, and the flannels should be changed whenever they become dirty or foul. The house should have a good water-proof roof, and be built with a view to the comfort of the operator. The spawning season coming and continuing during the coldest season of year, it will be found that to warm the hands at a stove will add very much to the comfort of the operator. If the stripping process is resorted to, the fingers become numb with the cold, and a fire at that time is acceptable. Great care should be taken that the temperature inside of the house should never get above forty-five degrees.

The windows should be made on the west and south side, and guarded by either shutters or curtains, to prevent the sun's rays from coming into contact with the eggs, which would destroy them if permitted to fall upon them for any length of time. It is well enough to allow the sun to shine on the young fish a short time each day, but it is death to the eggs. A good tight floor to keep out the cold, and animals which might destroy the eggs, is necessary. The water is conveyed by means of a trough along the side of the house, over the upper ends of the boxes, and let into the hatching troughs by faucets of one-half inch diameter, or through holes cut into the troughs, and regulated by means of a wooden slide.

The troughs should be made of seasoned timber, one and a half inches thick; they should be six inches deep and eighteen inches from outside to outside, or fifteen inches in the clear, and the length regulated by the size of the building; sufficient room given to pass the lower end—say four feet. These troughs are divided into squares or nests, by cross strips set on the bottom, at a distance of two feet apart. These strips are made half inch thick, and two inches high. These are set on the bottom, and small strips nailed on each side of the box, for the purpose of keeping them in place, fitting tightly to sides and bottom, and allowing the water to flow over them evenly. Other strips are made to fit on the top of these, to raise them to within an inch of the top. As these strips are not often removed, they should be made to fit accurately. The troughs should be lined, both sides and bottom, with glass, as that will prevent any sap, if there should be any, from coming into contact with the eggs.

The first division of the trough should be but one foot. This is to catch the water as it comes from the conducting trough above, and no eggs are placed in this nest; also a nest of one foot left at the lower end, in which no eggs are placed; this to catch the water as it falls over the last strip, and having a small screen attached to prevent the young trout from being washed out of the troughs; a fall of two inches will be sufficient to gain the troughs. The supply of water for each trough should be equal to that coming through a half inch hole with three inch head.

The gravel used for the hatching boxes should be about the size of a pea. This should be washed carefully, so as to remove all dirt and free from iron rust.

Seth Green recommends boiling it so as to destroy any eggs of insects which may adhere to it. The gravel should be spread evenly over the bottom, one and a half inch deep, so as to bring it within a half inch of the surface of the water, when the eggs are placed in one of the nests.

The implements used by the operator are few—consisting of a few feathers for spreading the eggs evenly over the bottom. To remove the dead eggs, some use a siphon, some a large syringe, and others use a pair of nippers, the lower part made in a spoon shape, and a small arch made in the shape of the letter D, with a handle in the middle. This can be made of wire, and thin gauze spread over, forming a bag of half an inch long; this is used for removing the young fish from the troughs; it should be about the size of an ordinary tea cup, the straight side moving on the bottom of the trough.

Having the ponds laid out, hatching house, troughs, &c., all arranged, the next step is to get the eggs. If there are no trout in the ponds, then the impregnated spawn will have to be purchased from some reliable establishment. They cost from eight to ten dollars per thousand; young trout three months old, from $30 to $40 per thousand; and spawns from one to two dollars each. The eggs that are purchased are packed in moss, and this in tin cans.

When the eggs have been received, the can should be placed in water of the same temperature as the can; then gradually increase or reduce the temperature to that of the water used for hatching. The eggs are of a light amber or straw color. The moss should be picked carefully from them, and the eggs cleared of all foreign matter; then the water should be raised by an additional strip to about three inches in depth; the end of the pan which contains the eggs should be gently lowered under the surface of the water, so that the water in the trough or pond be agitated as little as possible. By moving the pan the eggs may be spread over the bottom of the trough. If they fall in a heap, take a feather and move it through the water; the eggs will follow the direction of the feather. They should not come in contact with each other. When all the eggs have been distributed, then remove the strip placed across. This must be done gently and gradually. If it be taken up suddenly the eggs will follow the current of water and go into the nests below. This is soon learned. After one or two trials there will be no trouble. The earliest eggs should be placed in the upper nests, for the reason that they will hatch first, and the water can be raised over that portion without flooding the others. Some prefer the lower nest for the first eggs. The only argument advanced for using the lower one is, that when the young are hatched they can be let swim from that to the nursery, when it is near, without any handling; but these practitioners are obliged to raise the water over all the strips, which prevents any ripple over them.

If the ponds are stocked with trout, there are two methods of securing the spawn. The first by hand. This method, although practiced by the writer but one year, was very successful, and in handling the fish not two out of a hundred were lost, and this was early in the season. About the 1st of October the fish work up towards the heads of the ponds. They gradually leave the deep water, and are to be seen at the shallow places. The raceways should be cleaned of all weeds and dirt about the 1st of September; graveled and covered over with boards. As soon as they are ready to spawn, they will enter the race-way, seeking a place to rest. Here the males will commence fighting for the affections of the female, and wage fierce battles, the victor being left alone without molestation. The female swims about uneasily, examining the beds for a spot to deposit her eggs. The difference between the sexes is soon discovered by careful observation. The male grows long, slender and irregular in shape, with the lower jaw sharp and pointed, extending beyond the upper, the colors brought out in their brightest hues, the fins deep red, while the female dresses in a much more sober garb, having a dull drab color, the shape changing very much from that of the male. The abdomen round and full, distended by the weight of her eggs, gives her an oval shape.

Great care should be taken in capturing the fish at this time, so as not to injure them, and they should be handled very gently.

Now by carefully watching their habits, it will be seen that the female is ready to deposit her eggs; provide a net made of coarse bagging or gunny cloth, about six feet long, and just wide enough to fit the race-way, the end tied together with a string; place your net as quickly as possible in position, so as not to allow any of the fish to escape; then with a switch or brush, go to the head of the race-way and whip the water; this will force them in the net. As soon as all are in the net, it can be lifted out of the water. Have a tub of water close at hand; then lift the end of the net in the tub, and open the end and the fish will fall into the tub.

Coarse cloth is much better for a net than twine, as the latter will catch the gills of the fish and injure them, and the cloth is easily tacked on the frame, and the force of the water swelling it out, the fish will run into it, and not seeing any one, will not want to escape, thinking they are fully concealed.

The fish are now at hand ready to be handled. As the weather is generally very cold, the tub should be taken into the hatching house. If they show signs of weakness or want of air, water should be poured into the tub from above, so as to revive them. This will answer for a short time. It is better not to put many in the tub at one time. Take your pan, (an ordinary milk pan, holding six quarts,) and fill one-third full of water, then select a male fish, taking hold of him by the head and shoulders with the right hand, in a firm grasp, and with the left hand grasp the tail or lower part of the body, holding the vent of the fish under the water, bending the head and tail slightly upwards. As soon as the fish is quiet, if the fish is ripe and the milt well matured, a small portion will be emitted. With the forefinger of the right hand under the belly, rub gently towards the vent. The right hand may be slipped from the head and shoulders and gently passed towards the tail. The female is treated in the same way; the bending of head and tail forcing the abdomen outward will, if she is fully ripe, cause the eggs to flow.

I have reversed this rule and taken the fish by the shoulders with the left hand, and the right grasping the tail, and holding the fish by the shoulders loosely, encircling the belly with the right, and passing the forefinger down as before. I found no difference in the change.

The milt of one male will impregnate five thousand eggs. In speaking on this point, Thaddeus Norris relates the following: "About the middle of May, I met Mr. Ainsworth, by appointment, in Elk county, Pa., to enjoy a few days' fly fishing. In our conversation on the impregnation of ova, he narrated the following occurrence: Last fall, near the end of the spawning season, when the males had mostly cast their milt, he one day had taken enough eggs to cover the bottom of the pan, and could only procure a single male. From this he expressed not more than a good sized drop of milt, not enough to tinge the water. He, nevertheless, set the pan away, giving the ova and this slightly spermatized water the usual time, and then placed the eggs in a separate nest in his hatching trough, and was agreeably surprised, in a few days, to find them all impregnated. In due time they hatched, but few eggs being lost in incubation." This goes to show how little milt is required. But in order to be certain, it is better to have enough than too little.

The eggs should be allowed to remain in contact with the milt from fifteen to twenty-four minutes. The pan had better be set in one of the troughs in order to keep the temperature of the water the same, and care taken so as not to set the pan on any ice or where it might freeze, as this will kill the eggs in a few minutes.

While the eggs are in the pan, a gentle shake, no sudden shock, should be given; this is to change their position, so that all the eggs come in contact with the milt. When the eggs from the female are deposited they are covered with a *glutinous* matter, which causes them to adhere to whatever they may touch. This matter, after a space of thirty minutes, is absorbed, and each egg becomes loose and will not adhere to one another—pour out the dirty water, and carefully add fresh water on the eggs, so as to remove all the foreign matter; then raise the water in the trough as before described, and deposit the eggs on the gravel.

THE SECOND METHOD.

I have used Collins's patent spawing box, and would recommend it to all who desire to go into trout raising on a larger scale. From 90 to 95 per cent. of the eggs were impregnated, which were taken off from his screen, and it has many advantages which are superior to any other method now in use. The operator will find that the stripping process in the winter is cold and disagreeable work, the fingers becoming stiff, and at times it is rather difficult to handle the trout. By the use of Collins's patent spawning box the operator need not wet his hands; the construction is simple, there being nothing complicated about it. The box can be made of any size, which is regulated by the number of spawners in the ponds, from four to sixty feet long, and from two to eight feet wide. The one we have in operation is 4 feet wide and 40 feet long, and two feet deep, with the bottom covered with boards and top open, and the ends closed to within one foot of the top. Along the whole of the bottom, in the edge, is a strip one inch square, and I have put two additional strips one foot from each side, the whole length, to keep the cross pieces from catching any boards that may be *sprung* by the unevenness of the bottom of the race-way. On the sides, nine and eleven inches above, are two more strips nailed to the side, leaving a space of one inch between them for the lower or fine screen to pass between. On the upper strip are set boxes from six to eight feet long, divided into co-partments of two feet square, each filling the box with the exception of one foot from each end, the centre is cut out three inches deep and six wide, one foot from each end, and six inches above the bottom boards, is the centre for the rollers, over which the fine screen passes. This screen is made the width of the box, and at the distance of every two feet cross pieces are tied on, which fit in the upper groove and run on the top of the bottom strip. The lower roller has a cog wheel attached with handle, so that by turning the handle the lower roller revolves; this carries the continuous screen around; the other boxes are made in squares of two feet, and six inches high; to the bottom of these are nailed galvanized wire, three or four meshes to the inch; on this wire is placed gravel the size of a marble, say three-eighths inch in diameter, one inch deep. In front over the opening, (one foot,) place a board, fitting tightly, bored full of holes one-half inch, so that the water will flow on the fine screen with a gentle current, and over the lower opening have a fine screen on hinges, so as to lift towards the upper end; a small screen at the upper end to keep the trout from going any further up. When this is set in the water at the head of the stream or race-way, with the water within about five inches of the top, the trout will come in at the lower end, and finding a good nest, the female will whip the gravel with her tail, and clearing it off from the wire, will press her abdomen against it, expelling her eggs, which the male will cover with his milt, the eggs drop down one inch on the other small screen and are ready to be taken off. This can all be done without wetting the hands, and keeping them gloved, as the operation is performed out of doors, and in cold weather. The spawning box is covered with boards, and the screen can be turned without disturbing the fish, and they can spawn while the eggs are being taken and not a single one lost.

It has been found that the eggs are better impregnated by this method than any other.

After the eggs are placed in the hatching boxes, every dead egg should be removed as soon as discovered; these dead eggs are known by their white color. All vegetable matter should be removed, and the boxes kept perfectly clean, and the temperature of the house kept below 55°.

About the tenth day, a thin line appears around the yolk and within the egg shell; this is the origin of the spinal column or backbone of the fish. As this line increases in size, one end—that which is to form the tail, becomes pointed, while the other, which finally develops the head, flattens. Two black specks, which will eventually prove eyes, soon appear in this flattened part—in fact, the entire form of the fish can be traced in the envelope.

When nearly ready to be hatched, the young may be seen in the egg, wriggling at a lively rate, the envelope looses some of its transparentness, and becomes furred and rough, causing the inexperienced pisiculturist great fear least the eggs have become worthless—the motions of the fish increasing in violence, until its struggles weaken and rupture the shell, and the young fish bursts into life, with a sack attached, almost as large as the egg itself; this sack sustains life for some forty days. These little creatures seek the dark corners of the box and crevices, and hide themselves as well as they can, and remain quiet for several weeks. After growing strong, they commence to swim about; when the sack is absorbed, the little creature enters into a new phase of its existence, and can then be called a troutlet.

This is the great critical period of their existence, and requires very great care, for now they have to be fed, and in such quantities that every particle is consumed. If any remains in the trough, it fouls it and cause disease. All such particles should be removed. They should be fed twice a day at a certain time, and the weaker ones should get their share.

The food given is either curd or liver chopped fine enough to pass through a sieve of copper wire, eighteen meshes to the inch. This should be mixed with water, and fed one drop at a time; a feather dipped into this and placed in the surface of the water will answer; the small particles will float off and the little fish catch them as they pass by. They can be kept in these boxes until the commencement of the following season. If they should become too much crowded, some of them should be removed to a small pond, well protected and covered in places so that the little fish can find shelter if they wish to.

The eggs of the trout will on an average number forty to the square inch, so that by a little experience a person is able to estimate the number very closely. The best way is to have a graduated glass, first counting out five hundred and placing them in the glass; mark the length, then add five hundred more, and mark that, and in this way there will be no trouble in finding out the exact number hatched.

Trout raised in ponds where they can get no natural feed, such as flies' larvæ, must be fed in some manner, and at as little cost as possible. This is done by feeding curds, liver and lungs of animals. The food should be chopped fine—about the size of peas.

Maggots are more nutritious and more natural than the above, and in order to feed the trout, provide boxes, with the bottom of wire, sufficiently open to allow the larvæ to drop through when shaken, and a sliding board at the bottom to detain them until hatched out. These boxes can be kept in some out of the way place, and when wanted carried to the pond, and shaken over it.

Seth Green allows the heart of a beef to be "*blown*," and dips it in the water, shakes off the larvæ, then sets his box away until wanted again. To go into the details, &c., would require too much space; and all those who would like to enter into the business, I would advise to purchase Seth Green's book on Fish Culture, and visit his establishment on the Caledonia creek, in Monroe county, N. Y., where they can, during the spawning season, take lessons in the art, and learn more in one day than by reading a dozen books.

THE HONEY BEE.

BY SETH HOAGLAND, MERCER, PA.

The history of the honey bee dates back almost to the creation. It appears to have been held in high estimation by the greatest minds in all ages of the world. Numerous passages, both in the Old and New Testaments, and in the writings of the poets and classical scholars of ancient and modern times, furnish abundant evidence of this fact.

The promise held forth to the Jewish people, which prompted them to undertake and accomplish the unparalleled journey of forty years through the wilderness, was that it should be "*a land flowing with milk and honey.*" The importance of this promise is magnified when we consider that it emanated from the Deity. The oldest riddle on record involves the bee and its products: that of Sampson and the lion. And, still later, we find *John the Baptist* in the wilderness of Judea subsisting upon vegetables and wild honey.

The wise men of ancient Greece and Rome did not deem the subject beneath their consideration. Pliny tells us that Aristomachus, a Grecian sage, devoted fifty-eight years of his life to the study of bees, and that Philiscus retired into solitude for the purpose of keeping and studying the habits of the honey bee. Aristotle, Pliny, Virgil and others, wrote extensively on this subject; and in later ages, 1792, Francois Huber, a Genevan by birth, published a work containing many valuable discoveries, the result of a lifetime of observation and unwearied toil.

Of American apiarians, no one has done more than Rev. L. L. Langstroh to advance apiculture. The honey bee has attracted and continues to attract the attention of naturalists, moralists and divines, as well as the most inquisitive minds of all denominations of men. The peaceful regularity which pervades the whole community of the bee affords a subject most truly instructive and sublime. But few animals exhibit in their social life such admirable policy, being free from all selfishness, and highly devoted to the promotion of the common welfare.

An increase in the cultivation of the honey bee would not only enrich the owners with useful lessons in natural history, as well as being pleasing and instructive; but, with a small outlay of capital and labor, would undoubtedly result in the addition of millions of dollars annually to the wealth of our Commonwealth. The profit in the poorest season is from 10 to 20 per cent., and in ordinary seasons from 20 to 60, and in favorable seasons from 60 to 120. Under skillful management, with the aid of the many late improvements, much more could be realized. A proper estimate of the profits can only be made by taking a number of years into consideration.

In order that this branch may be made more successful and profitable, it is highly important that the apiarian or bee-master should be fully acquainted with the instincts, habits, propensities and peculiarities of these wonderful little insects. By knowing these, he will be enabled to improve their condition, and afford them facilities for collecting and storing their treasure in the greatest quantity, and in the purest and most acceptable state.

A COLONY OF BEES

Is composed of three kinds: Queen, or female, drones, or males, and workers, or neuters. Strictly speaking, there are but two—the neuters being females in an undeveloped state. In a colony or swarm of bees containing 25,000 workers, there is estimated to be, in mid-summer, about one thousand drones, and one queen, which is considered the sovereign and mother of the whole colony. Five thousand bees will weigh one pound, under ordinary circumstances, but if filled with honey, a much less number will make that weight. In a state of nature, they inhabit hollow trees and the clefts of rocks on the mountain and river sides, where they congregate in communities, propogate and rear their young, lead a social life, labor for the common interests of their own organization, and, if need be, sacrifice their lives in the "national defence." Bees have been found in almost all the inhabited parts of the globe, except California. They are known to prosper two hundred miles north of St. Paul, on the Missouri, in the trunks of hollow trees, where mercury will freeze in the open air, as well as at the equator, in South America, where the thermometer stands at 80° in the shade. In all parts of the world they are alike characterized by unrivaled industry. So ardent is their passion to collect stores, that a young bee is often seen, on the day of its birth, visiting the forest and filling its sack with the nectareous fluid. They labor from the dawn of day until evening, as long as season and weather will permit, and show their economy by building cells on rainy days and at night. A fit example for mankind.

VARIETIES OF BEES.

The common black bee of America has been known in this country ever since the landing of the Pilgrims on Plymouth Rock; and it is supposed by some historians that it did not exist here prior to that date, as the Indians called them the "white man's fly." Let that be as it may, they now abound in limited numbers in all the States of the Union, although hunted with *fire and brimstone* since first discovered.

The Egyptian bee, a number of colonies of which have been imported to this country, has proved a failure, owing to its warlike disposition and aptitude to sting.

The South American stingless bee has proven too tender for our climate, and cannot withstand the October frosts of Pennsylvania.

A large brown bee has recently been discovered in Florida, which promises to be a valuable acquisition to apiculture.

The Italian bee, first imported into this country in 1860, promises soon to supersede all other bees. It is claimed that it is more docile, more prolific, hardy, industrious, and that it extracts honey from sources not visited by the black bee. By the aid of the late discovery of fertilizing queens in confinement, by selecting choice males and females, our bees could be improved as advantageously as our horses, cattle, sheep and hogs are.

HIVES.

During the last twenty-five years many valuable improvements have been made in hives. The movable comb hive was received with joy by all practical bee-keepers. Yet nineteen-twentieths of the hives since patented have proved worthless and inferior to some forms of box hives. Many apiarians throughout our State have been so imposed upon that they have denounced all patent hives, and returned to the old gum or box hive. Patent bee palaces, moth traps and self-dividers, with wire cloth enough to rig a fanning mill, have done more to retard bee culture in this country than the bee moth. That hive should alone claim superiority over the box hive which permits the bee-keeper to have ready access to open bottom and top, and allows the transfer of frames from one hive to another; and it should be plain, simple and durable, not too expensive, and not so constructed that it would require an engineer of scientific attainments to direct its operations should it get out of order.

WINTERING BEES.

Three-fourths of the bee-keepers of our State pay no attention whatever to the wintering of their bees. The hives are permitted to remain on the summer stands all winter without any surrounding. They are thus exposed to all the variations of temperature, and to the inclemencies of the weather; one result of which is, many colonies perish annually, and those that survive are so weakened that they are unable to secrete until the honey season is passed. The successful aparian will always strive to have his swarms all strong in early spring, and this cannot be done without careful, judicious wintering. A uniform temperature throughout the winter, which will keep the bees in a semi-dormant state, seems to be necessary. This may be obtained in several different ways: By protecting the hives on their summer stands, or by removing them to rooms or places prepared for them, which must be dry, dark and well ventilated, and of a low, uniform temperature, not falling below 32°, and never exceeding 40° fahrenheit. Bees thus located consume one-third less honey, and come out in the spring strong and healthy. Our winter repository is a building 16+28 feet, with double walls all around, floor and ceiling, with a space of fifteen inches between the walls filled with saw-dust, made perfectly dark and well ventilated. In this building we put one hundred colonies on the 1st of December, and return them to summer stands on warm, sunny days, the last of March. Treated in this way, they will consume only from seven to ten pounds of honey each, while if left unprotected on their summer stands, they require from twenty-five to thirty-five pounds, and upwards. Ventilation appears requisite under all circumstances in the winter management of bees. By judicious in-door wintering a saving of at least twenty pounds of honey per hive can be effected, giving in an apiary of one hundred colonies two thousand pounds, which, at twenty-five cents per pound, would amount to $400, a sum sufficient to erect a building.

BEE PASTURAGE.

In Western Pennsylvania, white clover, buckwheat, the linden tree, the golden rod and the aster are the main support of the honey bee. White clover and the linden tree yield the best honey. That from buckwheat and honey dew is of an inferior quality. Alsike clover is now sown extensively in many parts of our State for bee pasturage, hay and forage for farm stock. It produces honey in great abundance, and of a fine quality. The Italian bee, it is said, prefers the alsike to the white clover, and will visit it from early morn until late in the evening, extracting the nectar from its tiny cups. It yields two crops, and continues to bloom until frost comes.

The rapid spread of improved agriculture in our State has, to some extent, destroyed the natural honey resources, and the apiarian is admonished that honey-producing plants and flowers may be cultivated with profit, as well as pleasure.

This branch of rural industry has been impeded in this country for many years by a want of knowledge, and an earnest appeal is here made to the interest and intelligence of the agriculturists and bee-keepers of our State, for a zealous co-operation in establishing and encouraging bee schools, State, county and township associations, and for publications devoted to apiculture, and having in view the improvement and advancement of this delightful pursuit. It leads to a salutary exercise of the mental faculties; it induces habits of observation and reflection; it tends to enlarge and harmonize the mind, and to elevate it to worthy conceptions of nature and of nature's author. One who is a close observer of the habits of the honey bee cannot fail to become deeply interested in watching the wonderful instinct of these admirable creatures; and at the same time he will learn many lessons of practical wisdom from them.

It is evident, on reflection, that the keeping of bees, if properly done, must occupy some considerable time and thought. A man must be often about his bees, ascertaining and administering to their wants. The ignorant and lazy ascribe to "bad luck" the natural results of their not administering to such wants, and never think of attributing them to the right cause. "Whoever is fond of his bees is fond of his home," is a maxim well established.

Possessing, as we do, a genial climate and a fertile soil, capable of producing rich and varied honey-yielding plants and flowers, and having a due degree of knowledge and enterprise, the bees could be increased in our State to such an extent that the profits arising therefrom would pay our State and local taxes, in addition to supplying our tables with one of the choicest luxuries, and add vastly to the general wealth and prosperity.

A SYSTEM OF ACCOUNTS,

PREPARED TO MEET THE REQUIREMENTS OF FARMERS.

Submitted in competition for the prize of the Pennsylvania State Agricultural Society.

BY A PRACTICAL FARMER.

Farmers, as a class, are proverbial for the carelessness with which they keep their accounts. Many, while recognizing the importance and even necessity of an accurate system for merchants, professional men and others, still think their own business is such as to require none. This is a great mistake, the evil of which is obvious to any one on a little reflection. Indeed, it is an open question whether the majority of failures among farmers cannot be traced, directly or indirectly, to their want of accounts and consequent ignorance of their exact position in reference to those with whom they have dealings.

Many a farmer, instead of carefully noting down every transaction of a business character at the time of its occurrence, trusts entirely to his memory to "keep it right." Thus, unmindful of the scriptural injunction, to "deliver all things according to measure or weight, and put down in writing all that thou takest in or givest out," it is not surprising if his memory, burdened with the hundreds of transactions which take place in a year, should sometimes serve him false and allow bargains, often of much importance, to be entirely forgotten, while others are so confused in his head that he has no positive knowledge of any of them, and must trust for information to those with whom he has dealt, and who, perchance, may be more careful than himself.

This absence of accounts is sometimes of serious injury to the farmer. Taking advantage of his ignorance, dishonest persons, with whom every one must sometimes have dealings, may dictate terms in the settlement of a bargain different from the original and more favorable to themselves. And even in bargains between honest men, and where each is equally anxious to do only that which is right, disputes will sometimes occur, which create ill-feeling, and not unfrequently lead to expensive litigation. The true remedy for this is for each party to keep an accurate record of all his bargains, and if then it should be found necessary to appeal to the law, a well kept account-book would be a powerful witness.

But, that farmers may be enabled to keep an accurate account, it is necessary that they should have a suitable form. To furnish such an one has been the purpose of the writer of this article.

I have endeavored to make it clear and simple so as to be easily understood by all, and yet sufficiently full and accurate to answer the purpose intended as well, if not better, than a more complicated form. Of my success or failure the reader must be the judge. It is submitted, however, with the belief that it will be found, on trial, to be well adapted to its purpose. The first thing I would recommend is to make out an inventory of the amount of capital invested in the farm and appurtenances, so that, on the settlement of the year's account, the farmer may know whether his business pays him a fair percentage on his capital. This can be done in a few minutes, and will be something like this:

AN INVENTORY *of the farm and stock of John Smith, taken January* 1, 1865.

100 acres of land, @ $125 00	$12,500 00
4 horses, @ $150 00	600 00
10 head of cattle, (average,) @ $45 00	450 00
40 head of sheep, (average,) @ $5 50	220 00
10 head of swine, (average,) @ $20 00	200 00
50 head of poultry, (average,) @ $1 50	75 00
Farming implements and machinery	1,250 00
Total amount invested	15,295 00

This inventory should be placed on the first page of his year's account book. Nothing is required of it until the settlement of the year's accounts. A memorandum, in which to note down all the more important transactions of the farm, or such as it is wished to remember, will be found very convenient. A small book, either carried in the pocket, or hung up in some convenient place, should be used. Such entries in it as it is desirable to remember, may be transferred at leisure times to the regular account book, where a few pages may be devoted to their accommodation.

The following form will serve as an illustration of the memorandum:

John Smith's memorandum for the year 1865.

1865.

Jan. 20. Finished shelling last year's corn crop; 590 bushels.

26. Engaged two hands for the present year, to begin work April 1; I am to pay them $18 00 per month and board, together with other things, as per written contract.

Mar. 28. Commenced plowing for oats; ground in good condition.

April 10. Finished sowing oats; 44 bushels on 20 acres.

May 15. Sheared sheep; got a good wool clip.

18. Planted corn.

June 4. Have begun to under-drain the "wet field;" it will require about 6,000 tiles, which we wish to get in this week.

25. Engaged to furnish William Jones 25 bushels seed wheat in time for this season's seeding, @ $3 75 per bushel.

30. Have this day commenced harvesting; wheat good.

Aug. 10. Bought three tons artificial manure of Allen & Co., to be delivered September 1, @ $45 per ton, cash.

25. Bought a grain drill for $65.

Oct. 4. Harvested potatoes; from 1½ acres gathered 230 bushels.

6. Engaged my potatoes @ 80 cents per bushel, to be delivered October 20.

10. Commenced husking corn; will shell and market it as fast as husked.

12. Bought 50 sheep, at an average of $4 25 per head.

Dec. 10. Bought five tons of coal, to be delivered at my door @ $6 50 per ton.

26. Have marketed all my grain, except what is reserved for feed and grain.

28. Butchered one beef—weight, 750; and eight swine—aggregate weight, 2,135.

31. Balanced my accounts for the year, and find my affairs in prosperous condition.

Besides this memorandum, it will be found very convenient to have a slate or piece of paper kept in some accessible and frequented place, on which to note down jobs that are to be done at leisure times. Very often such jobs as are out of the routine of farm work will come to memory when they cannot be done. By having this kind of arrangement, and then examing the slate a leisure times, they would be much less likely to be forgotten. It is often desirable to know the exact cost of a particular crop, or of all the crops grown on the farm, so as to compare them and see which is most profitable, or whether the cost of production is not greater than the market value of the article after being produced. The following form is given as a good one to follow in keeping such accounts:

Corn field, 1865.—(20 *acres.)*

Dr.

1865.			
April	20.	To 10 days' plowing, @ $2 50	$25 00
	25.	4 days' harrowing, @ $2 50	10 00
	28.	2½ days' furrowing, @ $2 50	6 25
May	1.	2 tons poudrette, @ $25	50 00
		3 days, applying manure to hill, @ $1 50	4 50
	2.	2½ bushels seed, @ $1 50	4 25
		8 days' planting, @ $1 50	12 00
June	10.	5 " plowing corn, @ $2	10 00
	20.	5 " plowing corn, @ $2	10 00
July	10.	5 " plowing corn, @ $2	10 00
Sept.	20.	10 " cutting and shocking, @ $1 50	15 00
Oct.	25.	20 " husking, @ $1 50	30 00
		4 " drawing in corn, @ $2	8 00
	30.	2 " drawing in stalks, @ $4	8 00
Dec.	28.	marketing 960 bushels corn, @ 5 cents	48 00
		interest on land, 20 acres, @ $125=$2,500, @ 7	175 00
		Total cost of crop	426 00

Now let us see the credit side of the same field:

Corn field, 1865.—(20 *acres.)*

Cr.

Dec.	28.	By 960 bushels of corn, @ $1 10	$1,056 00
		3,000 bundles stalks, @ 3 cents	90 00
		Total amount received	1,146 00
		Deduct charges	426 00
		Net profit	720 00

Cost per bushel, according to the above account, 44⅔ cents.

In accounts like the above, two pages, *facing each other*, should be used. The Dr. side should be on the left hand—the Cr. side on the right.

Somewhat similar to the foregoing would be the account of live stock, of which a form is here exhibited.

Sheep, 1865.

Dr.

1865.		
Sept. 30.	To 40 ewes bought, @ $4 50	$180 00
Nov. 15.	pasturage, 40 head, 45 days=1,800 days, @ 1 cent,	18 00
1865.		
April 15.	To feeding and foddering, 6,000 days, @ 1 cent	60 00
May 15.	shearing and marketing wool	5 00
Sept. 15.	pasturage, 6,000 days, @ 1 cent	60 00
	Total cost	323 00

Sheep, 1865.

Cr.

1865.		
May 15.	By 120 pounds wool, @ 60 cents	$72 00
	35 lambs, @ $4 50	157 50
Sept. 15.	40 sheep, @ $6	240 00
	Total income	469 50
	Deduct charges	323 00
	Net profit	146 50

Poultry, 1865.

Dr.

1865.		
Jan. 1.	To stock on hand	$75 00
Nov. 24.	dressing and marketing	5 00
Dec. 31.	feed during the year	85 00
	Total cost for the year	165 00

Poultry, 1865.

Cr.

1865.		
Nov. 24.	By poultry sold	$115 35
Dec. 31.	poultry on hand	75 00
	eggs during the year	82 85
	Total amount received	273 00
	Charges deducted	165 00
	Net profit	108 00

In accounts of this kind, where there are small sums received and expended every few days, as in the sale of eggs, or the use of corn or feed, a few bushels at a time, it is well to have a page prepared in the account book, where the receipts and expenditures may be immediately wrote down. The writer's first experience in keeping accounts was in keeping the account of his father's poultry, on the plan here recommended, though in a book kept for that special purpose. Accounts, similar to the above, should be kept with all with whom the farmer has dealings, as the shoemaker, the blacksmith, the grocer, &c.

Subjoined is a sample of a blacksmith's account:

Blacksmith.

DR.

1865.		
Jan. 5.	To 2 bus. potatoes, @ $1 25	$2 50
20.	12 bus. corn, @ $1 30	15 60
Mar. 8.	1 cwt. feed	2 25
Apr. 5.	2 days' plowing, @ $3 50	7 00
Oct. 12.	3 barrels apples, @ $3 00	9 00
Dec. 31.	cash to balance account	55 55
		91 90

Blacksmith.

CR.

1865.		
Feb. 4.	By shoeing 2 horses	$4 00
10.	repairing sleigh	2 50
Mar. 25.	putting plows in order, laying shares, &c	7 25
28.	23 new harrow teeth	4 00
Apr. 5.	setting horse shoes, sharpening shares, &c	85
June 10.	hooping wagon wheels	3 50
18.	repairs to mowing machine	4 00
Aug. 20.	ironing new wagon	65 00
Sept. 10.	sharpening shares	80
		91 90

Enough of these forms have been given to show the general principle on which all are kept. The next account will be a cash account, in which should be entered all moneys received or disbursed, so that on making a comparison of the funds on hand with what the book shows *should* be on hand, the farmer will know if his monetary affairs are all right. It is also useful as showing where the money comes from and, what is generally considered more important, where it goes to.

The annexed is a form for this account:

Cash Account.

DR.

1865.			
Jan.	1.	To cash on hand	$151 65
	10.	cash received for corn sold	250 00
	21.	cash received for oats sold	380 00
Feb.	8.	cash received for poultry sold	7 50
April	25.	cash received for wool sold	75 25
June	15.	cash received for hay sold	12 00
	20.	cash received for lambs sold	150 00
Aug.	30.	cash received for seed wheat	110 00
Nov.	24.	cash received for poultry	85 00
		Total amount received	1,221 40

Cash Account.

CR.

1865.			
Jan.	12.	By cash paid for fuel	$25 00
Mar.	10.	cash paid for labor	188 00
April	5.	cash paid for manure	55 00
June	5.	cash paid for mowing machine	140 00
Aug.	12.	cash paid for building hovel	205 00
Sept.	1.	cash paid for store account	50 00
Nov.	12.	cash paid for taxes	85 50
Dec.	18.	cash paid for labor	100 00
	28.	cash paid for blacksmithing	65 00
	31.	cash paid for balance of store account	75 00
	31.	cash on hand	240 90
		Total amount expended	1,221 40

The next and last account will be one of the farm itself. At the time of making the annual settlement, which has in these forms been assumed to be January 1, though perhaps April 1 is more generally used, an account should be made out of the productions sold from the farm, and the moneys expended in raising them. If it is desired to have a record of the *gross product* of the farm, then all that is raised should be entered on the credit side of the account, and that that is used on it, as seed, feed, &c., should be charged to it. This is not generally desirable, as some of the products which are fed up on the farm, and thus converted to meat, butter, &c., which is also sold, will thus require to be credited twice, and charged once, making three entries in all; while by keeping account only of that which is sold, it will require but one entry. But if it is wished to have the cost of the meat, butter, or wool crop, a separate account may be kept, as in the form given on a previous page, (for sheep.)

In this account the *cost* of *permanent* improvements is not included, but the *interest* on the whole capital invested is charged to the farm. If new buildings are erected, the cost is added to the amount invested and thus become a part of the capital.

The Farm.

DR.

1865.			
Jan.	1.	To amount paid for manures	$450 00
Sept.	10.	amount paid for seed bought	100 00
Dec.	31.	amount paid for labor	800 00
		amount of interest on investment, $15,295, @ .07,	1,070 65
		amount of profit to balance account	1,293 85
			3,714 50

The Farm.

CR.

1865.			
Jan.	20.	By corn sold	$241 00
	22.	oats sold	180 00
Feb.	8.	sheep sold, (profits of fattening,)	125 00
April	10.	wheat sold	260 00
May	12.	wool sold	82 50
June	5.	lambs sold	165 00
Nov.	28.	new wheat crop sold	895 00
Dec.	15.	new corn crop sold	1,486 00
	28.	profits on poultry, swine, &c	280 00
Dec.	31.	Total amount received from farm	3,714 50

In this account it will be noticed that there is a diagonal line drawn from the line just below the last entry on the Dr. side, to the last line on the page. This may need a little explanation. (This line has been omit ted from the other accounts to save space.) As has been already said, accounts of this kind should occupy two pages facing each other. Now, in many cases the one side of the account will have many more entries than the other. In settling accounts, the amounts when summed up, should be put down on lines even with each other. After this has been done, the line should be drawn to show that the account is settled.

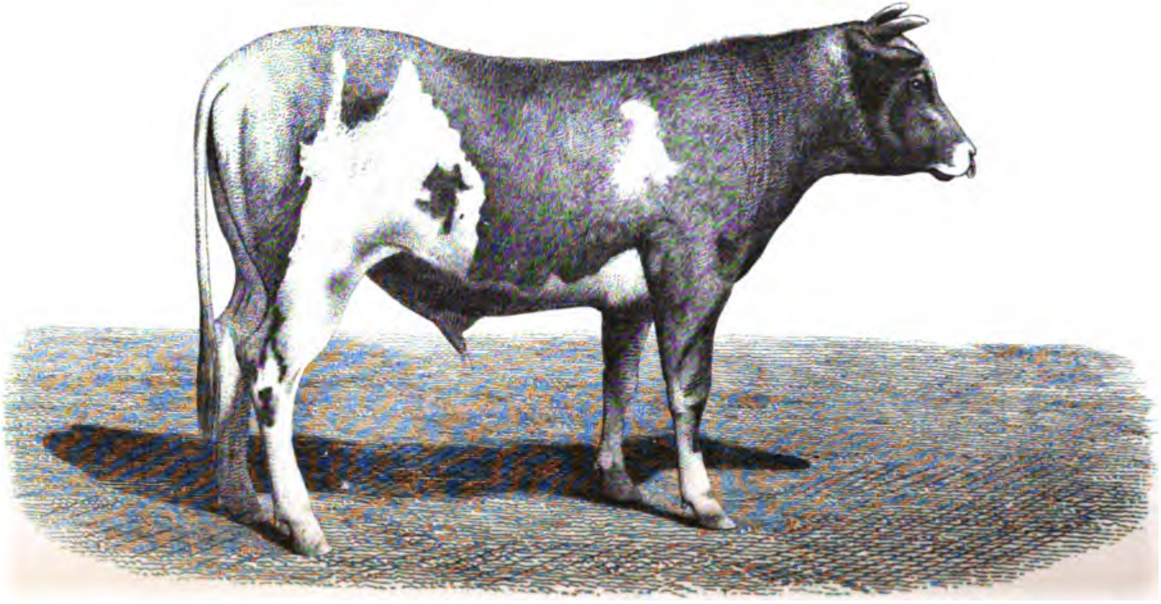
Here we close the illustration of the subject of Farm accounts. The form here exhibited is believed to be admirably adapted to its purpose. It is true it is some little trouble to keep on accurate and full record of farm operations, but so it is to do anything properly; but a few moments now and then during leisure hours, will not be much felt, while the knowledge of a man's exact position in relation to his business matters, will amply repay him for any little trouble he may take to secure such a desirable result.

AN ESSAY ON THE USE OF AGRICULTURAL PERIODICALS.

BY J. F. WOLFINGER, OF MILTON, PA.

"*A Periodical*," as defined by Webster in his Dictionary, "is a magazine or other publication, that is published at stated or regular periods" of time. And hence we have what are called weekly, semi-monthly, monthly, quarterly and annual periodicals of printed information, in the various departments of human science and art. And "*Agricultural* periodicals" are such as treat of agriculture, our greatest and most important national industrial pursuit.

And now the question arises, what is "*the use of agricultural periodicals?*" One man publishes an agricultural periodical, that contains nothing but agricultural information, and another converts one or more columns of his "newspaper," or "literary magazine," into what he calls his "agricultural department," for the benefit of such of his readers as have or take an interest in rural affairs, while another, again, publishes an "agricultural periodical," principally for the purpose of advertising, puffing up and increasing the sale of his own "special manures," manufactured by himself or under his general superintendence. And they all make or try to make a good living at this business, that being "the use" which *they* make of their "agricultural periodicals." This is an answer to your question, viewed in its plain, *literal* sense. But as you evidently meant something different



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from this, to wit: *how agricultural periodicals should be prepared to enable farmers, gardeners, cattle breeders, &c., to make a good use of them, and derive the greatest possible amount of benefit from them,* I will now proceed to give you my views upon that phase of your inquiry. In order to be useful, highly useful, to our farmers, gardeners, cattle breeders, &c., the agricultural periodical taken by them, and perused in their families, should always present the following permanent internal characteristics, to wit:

1. *It should always manifest a thorough acquaintance with the elementary principles of agriculture.* When we speak of the principles of any art or science, we always mean those theoretical truths and those practical operations that are essential to success in that art or science. And as no farmer, gardener, &c., can expect to succeed easily and economically in his calling, without such knowledge, it is evident, as clear as can be, that the reading matter prepared for his benefit will be useless, just so far as it fails to give him the knowledge, both elementary and practical, that he needs.

2. *It should carefully avoid giving its readers any agricultural reading of a doubtful or injurious tendency.* This is necessary to make its teachings safe and reliable. And whenever it does notice agricultural theories and practices that are of doubtful utility or of an injurious nature, it should always point out their errors and objectionable features so clearly as to guard its readers against being misled or deceived by them. A good deal of the agricultural reading contained in our "*newspapers*" is usually too loose and inaccurate to be trusted by the practical farmer, gardener, fruit-grower and cattle breeder. Let me illustrate what I mean. Some years ago a friend of mine read a statement—then going the rounds of our "newspapers"—that the *refuse parts* left after *soap boiling* was over, were very good for manuring fruit trees. So he scattered some of these oily and strong fatty substances contiguous to and around the trunks of his fruit trees, but to his utter astonishment and regret they only served to injure and finally destroy several of his large trees. If the "newspaper" writer had informed him that these soap-matters should be first diluted or dissolved in a sufficient quantity of water to weaken and neutralize their sharp and burning nature before applying them to the bark and roots of his trees, it would have been right and much good might have been the result instead of loss. But no such instructions were given him. So some of our "newspaper" agricultural writers say that the stalls where our horses, cows, oxen and sheep stand, and are fed or fattened, *should be cleaned out nicely every morning,* to remove noisome smells and ensure the health and thriftiness of our domestic animals. But some of our most successful practical farmers, both in Europe and in America, leave the manure of these animals lie in their stalls for days and weeks, and even months, especially in autumn and during

winter, before it is thrown out into the dung-yard or shed, and this, too, without experiencing any injury from it either to the health or the thriftiness of their animals. And experience shows that if the manure dropped in the stalls is levelled off and nicely covered over every night or two with fresh and clean dry straw bedding, very little or no noisome smells will issue from the heap. And it shows, too, that the manure so made will be much better than that which is thrown out of the stable every morning, since the manure that has lain in the stalls for weeks and months will not only absorb and retain the animal's urine, but will have its solid parts so compactly trampled down and packed that the entire mass will rot much sooner and make a much finer and richer manure than that which is thrown out every day or two, and which consists generally of dry, hard and unrotted straw, corn-fodder stalks and coarse refuse hay—that must lie in the dung-yard for months before it becomes a wet, soft and compact mass. So "newspaper" writers have told us that to make manure aright we must make a *manure-cellar* under our barn or stable to keep the manure there in the dry; that is, out of the reach of rain and snow, until it is hauled out upon our fields. But experience has shown that the manure kept in such cellars rots very slowly and is very apt to become mouldy or "*fire-fanged*," as if scorched with fire, for the want of a sufficiency of urine, water or moisture through its heap or mass. And hence, manure-cellars are not so popular now as they were some years ago. They would do very well, no doubt, if some easy way were contrived for keeping the manurial mass sufficiently moist to prevent mouldiness or "*fire-fanging*," and secure the proper kind of decay or rotting in its hard, fibrous materials. So "newspaper" agricultural writers have also told us, of late years, that the stables for horses and cattle on the *ground floor or lower story of our barns are too dark and damp to be wholesome for horses and cattle.* But our Pennsylvania farmers, who have long been celebrated for their splendid "bank-barns," have always kept their horses and cattle on the ground floor of their barns, and have always had strong and healthy horses and superior cattle—equal to any in the United States. Our Pennsylvania bank-barns are called so because they are built in against a bank of earth, either of natural or artificial construction—a bank so high upon the rear side of the barn, and extending, at times, more or less around the rear end of the barn, that a large wagon load of hay or grain can be hauled over said bank, up, into and upon the second floor of the barn—usually the threshing floor. And if any of these barns are in their basement story, too dark and unwholesome from the presence of foul and stagnant air or gases, it is only because they are not properly supplied with air-holes near the surface of the ground and over the heads of the horses for the escape of foul air and the admission of fresh air and light—defects easily remedied—or because the owners or tenants of said barns do not keep said basement stalls clean or their animals nicely bedded with clean straw as aforesaid. It is certainly a slovenly and injurious practice to let horses and cattle stand in their own soft, mushy dung, hoof-deep, and get their sides daubed and covered with it when they lie down—but the manurial management, here recommended, will prevent all that. And hence, the agricultural advice found in our "newspapers" should be practiced with great caution—and that contained in some of our regular "agricultural journals" is often not much better. And a well conducted agricultural journal that understands its duties will briefly review and condemn all of such and other erroneous agricultural theories and practices of the day as they rise, and, through superficial fancy writers, make claims on the popular favor.

3. *It should avoid publishing long articles that abound in words and but few ideas that are worthy of notice.* Such long articles not only weary but confuse the mind of the plain tiller of the soil, who is not sufficiently acquainted with logic and language to lop off all superfluous matter and separate truth from error. The agricultural editor, who receives such communications, should either reject them entirely or publish their best ideas only in a condensed form. These condensed sketches will be read far more freely, and also do far more good, than long and loose discourses. And the editor will thus secure more room, too, for other thoughts that are equally good, or even better, that would otherwise have been crowded out. Agricultural writers, however, who question the truth of our old theories or practices, or who broach something entirely new that bids fair to be useful, ought to have room enough to express their ideas fully, for the public good. But having done that they should stop, as all that comes after that is mere *twaddle*, or what is worse, an injurious *wrangle* between hot-headed disputers.

4. *It should not hastily adopt any new-fangled agricultural theory or practice.* Some men are always on the look-out for something that is *new.* And it is right for us to have an open ear to every one who offers to show us something new that will lessen our labors and expenses and make our labors far more productive and profitable than they now are. But many new things that promise much in theory fail to work well in practice. And hence we should never abandon what we know to be good and safe for any new agricultural theory or practice that may arise until many repeated experiments, made in various parts of our land, and all producing the same general result or results, show us clearly that there is no *humbug* or deception about it, but a certain reality. *Amateur* farmers, gardeners, fruit growers and cattle breeders will always be making new experiments. And it is well to have and leave the business in their hands, who have leisure and money enough to spend in this way, until they have given us something that can

be generally practiced without any danger of our spending our labor and means for naught. This is the pathway of wisdom and safety.

5. *It should give us correct descriptions of all such new and superior farm and garden seeds, fruits, roots and live stock, &c., as make their appearance at our county and State fairs, their value, prices, &c.* This is necessary to our progress in agricultural products. And when contradictory opinions are held in regard to these things, the opinions of both sides, *pro* and *con*, should be fully and fairly presented, with such comments as the editor may deem necessary or proper.

6. *Every number of the periodical should have its reading matter arranged under suitable heads*, as, for example, The Farm, The Garden, The Orchard, or Fruit Lot; Domestic Animals, Manures, The Dairy, Enquiries and Answers, Home Duties and Enjoyments, Miscellaneous Reading, and Agricultural Advertisements, with a good index to every part of it except advertisements, so that any point of information contained in any number of the periodical may easily be referred to. "*The Maryland Farmer*," a valuable monthly agricultural periodical, published at Baltimore, in Maryland, is paged regularly to the end of its agricultural reading matter, after which it gives us all of its advertisements in a continuous body, and without any paging or numbering of its pages. This is a very good arrangement, since it will enable its patrons, at the end of each year, to cut off all the advertisements and have the remainder—the most valuable part of the work—bound up into a regularly paged book for future use and reference.

7. *Every number of the periodical should also contain that kind of information that is most needed at that season of the year.* This will, of course, embrace a clear and brief statement of the different kinds of work, seeding, planting, &c., to be done during each particular month, together with such other information, of a more general nature, as our rural population may need, including pictorial views of superior fruits, farm animals and buildings, our various grapes, roots, vegetables, &c.

8. *And in treating of "Home Duties and Enjoyments," it should always give our rural population advice of the very highest and purest moral excellence.* The standard of moral excellence of character aimed at should be that which adorns the purest patriots and christians in our land, in order that our rural population, who are the back-bone and main strength and glory of our nation, may continue to grow up, generation after generation, with an abhorrence of everything that is mean, low and degrading, and with an undying attachment to everything that purifies, exalts and ennobles man and woman, both as an earthly and as a spiritual being. We are slowly coming up to this point in our various agricultural periodicals, but there is still much room for improvement.

9. And lastly, *it should always express its ideas in the fewest, plainest*

and strongest words it can use, that being necessary to enable the plain-minded farmer to understand and set a proper value upon and profit by its teachings. And every one who writes communications for it should do the same, and for precisely the same reasons, and he who cannot do this should cheerfully submit to his communications being pruned and condensed into such a shape. Some of our *professional* men and *literati* are fond of using what is called high-flown, lofty, pompous and magnificent language in their agricultural communications and addresses, a language far too refined, Latinized and Greekish to be understood by men of common education. Such communications are allowable and even commendable before *a learned audience*, but are entirely out of place in agricultural periodicals, and should be used very sparingly there, if at all; for we must use common language to men of common minds if we want to instruct and do them good in anything. This highly important truth is too often overlooked and neglected, and it is time that we have a radical and general reform in this particular.

And now, *how is the farmer to read and study his agricultural periodical to make the* BEST USE *of it for his own good and that of his family?* This is another phase of your inquiry that deserves an answer, and I answer it as follows: The farmer should read his periodical carefully, and after he has read enough of it to catch the leading idea or ideas of the writer, he should begin to exercise his own mind and think for himself what *other* reasons, if any, can be offered in favor of and against what he has just read, and keep doing this until he is satisfied which side of the question before him is right. And if the subject-matter of his reading be *new* to him, either wholly or in part, he should read the article over once (the first time pretty hastily) to get some general idea of its contents, and then, when he is more at leisure, he should read it again, slowly and very thinkingly, and if he comes to any word whose meaning he does not clearly understand, he should turn to his dictionary and settle that point before he proceeds any farther, and so he should proceed from sentence to sentence and paragraph to paragraph, until he has a clear idea of the writer's ideas; and then he should proceed again, as in the first instance, by holding up before his own mind all such additional arguments as he himself can suggest for and against the writer's peculiar views, until he, the reader, has again come to a satisfactory conclusion as to whether the said writer is right or wrong. And he ought also to inquire what his best-informed neighbors think of the matter, for they may, perhaps, differ from him in opinion, and for reasons that will satisfy him, too, of his having been in error. And he should train his children to read, study, think, compare and weigh ideas in the same way. And it is surprising how soon a man or woman who pursues this course will enlarge and strengthen his own powers of mind, and learn how to separate truth from error, and so, in a great measure, *educate himself*, until he becomes a well-informed man on all subjects that he reads and thinks about. But the farmer should be equally careful to do his reading at the right time, for the farmer who keeps reading *when he ought to be out at work* will not get his work done at the right time and way, and so be a loser in that way, while *he who never reads at all*, but works on as if he needed no agricultural information from any one, will be pretty sure to make serious mistakes, and so be a loser in that way. The wisest and best way, therefore, is for every farmer to read and study agriculture when he has spare time to do it, especially during our long winter evenings—the farmer's season of repose, and then, when the working season comes on, he will be ready to begin his regular labors in the field far more understandingly and, as a general thing, successfully than he who never reads to find out new and improved ways of doings things, that will lessen his labors, and at the same time improve his land and increase the produce of his various crops. Every farmer should have *a book of standard agricultural principles*—the very best work he can procure—to refer to and guide himself by in his farm work, so that he may learn wisdom from those who have pursued the same calling before him. And his next best help, after such a book, is a good practical agricultural journal, such as I have described. The idea that farmers do not need any books, and the reading and studying of them, to farm their lands profitably, is so deeply rooted in the minds of most farmers, especially in our own State, that it seems almost impossible to get this silly notion out of their heads; but it must be done if we wish to make progress in agricultural knowledge and success, and the sooner we can do it the better for their own as well as the public good. Here and there we find a man who is familiar with the pages of those master agricultural writers, to wit: Of Sprengel, Von Thœr and Liebig, of Germany; Chaptal and Boussingault, of France; Tull, Davy and Johnston, of England; Sinclair and Lowe, of Scotland; and Bordley, Armstrong, Fessenden, Buel and Ruffin, of our own country. And he who has read these, or the most of these authors, may be regarded as a man who is well booked up in agricultural knowledge; and yet even he, well booked up as he is, will not do without an agricultural periodical, for if there is anything new in agricultural affairs he likes to see and know what it is, and that is the place where he can find it in its most reliable form.

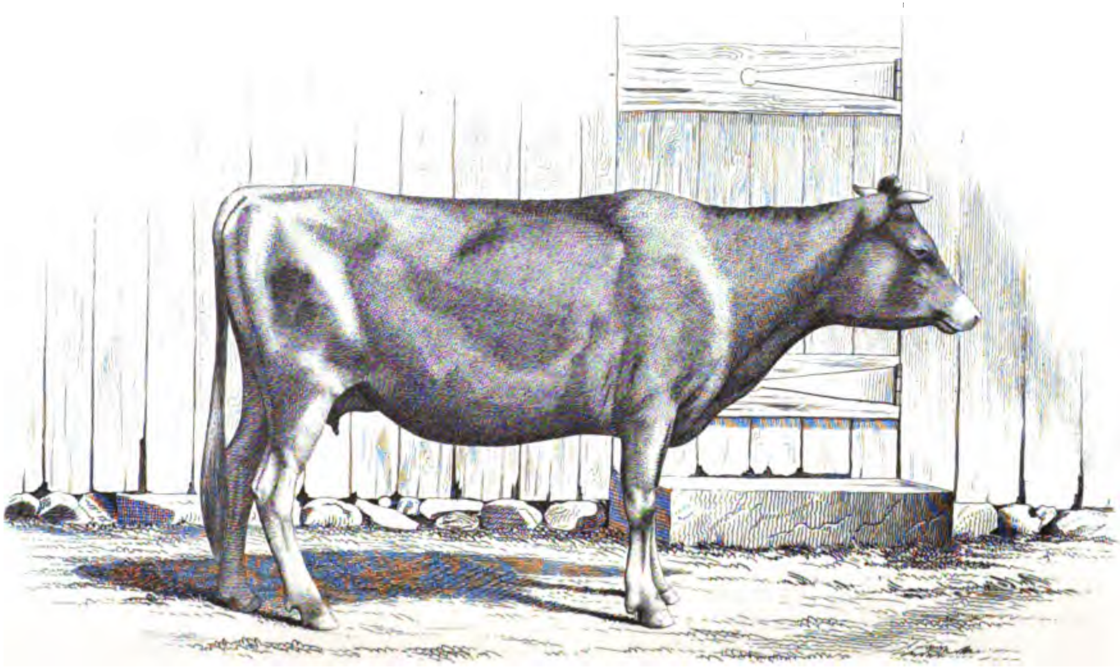
And now let us notice another important subject, closely connected with your inquiry; for your proposed premium of a silver cup for the "*best essay on the use of agricultural periodicals*" seems to convey the idea that we have plenty of such periodicals in our State, and that all we need is to know how to prepare and use them to the best advantage. But this inquiry, right and proper as it is in itself considered, is a most humiliating one for our State pride when we re-call to mind the fact that our great, rich and generous-hearted old State of Pennsylvania has not one single agricultural periodical of her own published within her borders, but is entirely dependent upon her sister States for such information! How long shall this state of things continue? We certainly have the means and the talent to make and support an agricultural journal of the very highest order of excellence, and if we fail to do it, it will be a burning shame to us all. Repeated attempts have been made to establish such a journal, but they have all failed of success, through some cause or other.

Our sister State of New York has two weekly agricultural periodicals, to wit: "*The Country Gentleman*," at Albany, and the "*The Rural New Yorker*," at Rochester, and one semi-monthly, to wit: "*The Rural American*," at Clinton, near Utica, and four monthly ones, to wit: "*The Genesee Farmer*," and "*The American Farmer*," at Rochester, and "*The American Agriculturist*," and "*The Working Farmer*," in the city of New York; seven in all. And now, if the State of New York can support seven agricultural journals and do it handsomely, as she does, why should not Pennsylvania feel it both her duty and her pride, to support within her borders at least one agricultural journal, properly so called, and make that one pre-eminently attractive and good? This is an important question for the consideration of your committee, as the thinking literary head of our Pennsylvania State Agricultural Society. It will require a considerable amount of capital (money) to establish such a journal upon a solid basis, but that capital can be had, if we have the right sort of men to undertake the business. And it is very clear to my mind, that to make the desired journal attractive, popular and successful, it must have a corps of regular monthly correspondents, who have a clear understanding of the principles that lie at the foundation of an improving and highly successful husbandry, and also the ability to communicate that knowledge to others in a few plain words. A corps of such writers will supply its readers every month, with just that kind of information that the hard working and unlettered tillers of the soil needs and longs to have, and is willing to pay for. I have for some years been a reader of "*The American Agriculturist*," and "*The Working Farmer*," published in New York. But these journals, popular as they have been and still are, are in my opinion quite defective in that general elementary agricultural teaching that our rural population needs. For pretty pictorial illustrations of rural objects and scenes, and "cracked up" special manures, and pompous self-praise and promises of some *new*, great and valuable agricultural knowledge soon to be imparted, but that never comes to hand, will never supply this want. Such things may line the pockets of the editors with plenty of gold dollars or United States "green-back" paper notes, but will leave the husbandman as destitute of needful information as he was before, and so do him but little or no good.

And hence, a properly conducted agricultural journal would differ very materially from such agricultural journals as we now have. For it would contain what we seldom see, choice extracts from the writings of our profoundest agricultural writers, accompanied with suitable comments and illustrations, and also show its readers new and improved ways of doing things that have been well tried and are reliable. So it would give clear descriptions of the nature of the soil on which new experiments were made, and the kinds of manures that were used, and how, and when, and in what quantities they were used and at what cost, so that its readers would not remain in ignorance upon any point of material inquiry—matters that are generally far too loosely and inaccurately stated to be useful. But the talent necessary to conduct such an agricultural journal can be procured in our own State, and without our depending for it upon any foreign aid. And no agriculturist who wishes to keep pace with the progress of the age can well do without such a journal.

And the money that he spends for it will not only furnish his children with interesting and valuable reading, but also give him and them at times hints that, rightly acted on, will often enable them to make, in divers ways, $10, $20, $40, $50 or $100, or more, out of the information that has only cost him a dollar or two. I do not say that he should try or experiment with every new thing that he finds recommended in his journal—far from it, for the new thing in question may not suit his soil, his climate or his means—questions that he must carefully consider and decide for himself. But if the new thing recommended does suit his soil and his climate and means, and would be profitable if successful, let him try the experiment on a small scale, and if it fails why he has not lost much, either of time or money, and if it succeeds and does well it will be an easy thing for him to enlarge his experiments another season. Much more might be written upon this subject, but what I have said will suffice, and it may, perhaps, give you some hints that our Pennsylvania State Agricultural Society, and the friends of agriculture in general, may hereafter turn to a good account in the establishment of a Pennsylvania agricultural journal, whose outward beauty will be an index of interior good of surpassing excellence.

An essay upon the origin, history and present condition of agricultural periodicals in our country would be interesting and useful. "*The American Farmer*," established at Baltimore, in Maryland, in 1819, seems to have been the first agricultural periodical published in our country. It was published by John S. Skinner, an enterprising printer, who, in 1829, ten years afterwards, commenced the publication of "*The Turf Register and Sporting Magazine*," which was also the first American journal of its kind. Skinner afterwards became the editor of "*The Farmers' Library*," a monthly agricultural journal, published in the city of New York. And since his day



JERSEY COW

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numerous agricultural periodicals, of various sizes and merits, have sprung into existence all over our land, almost every State and Territory, except Pennsylvania, having its due share of this kind of periodical knowledge for the instruction and benefit of the masses engaged in the culture of the soil. But, as I have no room to pursue this subject any farther, and might, perhaps, only weary your patience if I did, I will bring this essay to a close.

GUERNSEY CATTLE.

In the "Practical Farmer," Philadelphia, July, 1868, there is a paper which was read by me before the Philadelphia Society for Promoting Agriculture, on the merits of Guernsey cattle, as illustrated by my own herd. It was called forth by a remark in the first official report upon the Eastern Pennsylvania Experimental Farm, that "the ultimatum to be be sought in this, (the improvement of milking stock,) is the retaining of their superior milking qualities and the enlargement and perfecting of the frame of the Alderney." Believing that these requisites for a good milking or rather butter-making stock are in a great degree to be found in the Guernsey cattle, which, with the Jerseys, constitute what are called the Channel Island or Alderney cattle, I submit the following remarks:

To estimate properly the value of a breed of cattle for the dairy, we should consider the milking capacity of the cows, the quality of the milk and the health of the animals, as affected by ordinary care and by climate. In claiming that the Alderneys combine the requisites of *a good cow*, I can speak experimentally of the Guernseys alone, for, practically, I know nothing of the Jerseys.

My own herd, though small in number of cows at all times, never exceeding eight, was begun about twenty-one years ago, with a fine cow from the choice herd of Mr. Craig Biddle, and has been served during that time by bulls obtained from well known and imported stock. Among my cows there has always been a number of grade cattle, gradually approaching nearer to full blood—but never classed as such, though often quite equal in butter-making capacity.

To speak first of their health and ability to endure our severest winters and the extreme summer heats, I would state that during all their twenty-one years I have had but *three* sick cows upon my place—one from acute pneumonia, cured in a few days by bleeding, purging and warm messes, (she, by the way, was an Ayrshire cow, and an excellent one,) another from cold, after calving in the field in November, causing an attack of *milk leg*, from which she died after several weeks, and the third dying from internal hœmorrhage, within twenty-four hours after calving.

This immunity from sickness is not the result of extra care. As soon as the cold weather sets in the cattle are housed every night in a comfortable stable, and when the pasture is no longer good and nutrituous, say on the average from the 10th of November, they are kept in the barn-yard during the day, even in the coldest weather. From about the first of May they are turned into the field in the day time, until some time in June, when they are in the field day and night, being driven in for milking, which is always done in the stable.

I would mention that during these twenty-one years there have been but three cases of abortion—two of them *in heifers* of the same age, bred together, each of them aborting *three times* at the fifth month, but both of them carrying their calves on the next occasion to full time, when removed to another place, having, before this, been with the other cows of my herd, which never sympathized with them.

As regards their *milking qualities*, my own experience and that of others to whom I have sold both full blood and grade cattle is, that in *quantity* they are quite equal to the average of any other bred, while in *quality* they excel all others; consequently, as butter cows there are none to compare with them. The relatively large quantity of butter from their milk, with its beautiful grain, rich color and delicate taste, makes them the most valuable cows for butter dairies. They have also two other excellent qualities, the one their early maturity,* the other that they are persistent milkers, rarely drying up until within a month of calving, if properly fed.

They have also the advantage of size, over the Jerseys, and improve in that respect with each generation in this country, as all well kept herds will show. To obtain these advantages, the cattle must be *well fed.* By this I mean, that they must be *regularly* supplied with *sufficient food*, and that too of a succulent nature, both to keep up the full and regular flow of milk, and to bring them out in good condition in the spring. A statement of my own method of feeding will best illustrate my meaning. From the first of November to the first of May they have, twice a day, as much as they will eat, of *good hay*, not clover hay, but mixed, with two quarts of Indian meal, unbolted, and four quarts of wheat bran, and from a half to one peck of carrots or sugar beets, every day, to each. I never feed turnips of any kind, for they always give a taste to the butter. From the first of May to the first of November, or while the grass is good, they get nothing but grass; but when this is short in midsummer, they get in addition freshly cut cornfodder, an invaluable article for milch cows, and of which a large amount may be grown on a small piece of ground.

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* I know of more than a dozen heifers which bore calves at from thirteen and a-half to fifteen months of age. Nor was their own size or that of their calves, at four years old, any smaller than that of other cows of the same herd. In two instances they bore twin calves.

From a single experiment in soiling one summer, I am satisfied that a more regular and larger amount of butter may be made, if the cows are well supplied; but the expense of labor and the possible irregularity in feeding may counterbalance the other advantage.

The calves and young heifers are hardy and thrive well in winter on hay and cornfodder alone, though of course a little meal will help and improve them. As a matter of interest, and with the hope that it may suggest to other careful observers, the furnishing of similar statistics, I give below a statement of the product of my herd since 1858.

The average amount of butter, taking the number of pounds actually made, and estimating one pound of butter for two quarts of cream or twelve quarts of milk used, was in

1858, with	6 cows	206 pounds each.
1859, "	6 "	228 "
1860, "	6 "	203 "
1861, "	7 "	225 "
1862, "	7 "	212 "
1863, "	8 "	180 "
1864, "	8 "	198 "
1866, "	7 "	200 "
1867, "	6 "	222 "
1868, "	6 "	180 "
1869, "	5¼ "	200 "
1870, "	7 "	184 "

The average per cow was 203 pounds—it having been 208¼ for the first nine years.

In order to test the estimate of butter per quart of milk as given above, I have for the past three weeks been carefully measuring the amount of milk which will make a pound of butter, and I find that eleven quarts, average, will give one pound; and I am satisfied that five quarts of cream, such as used, would make three pounds of butter, so that the product of butter is understated, and the actual product per cow should be at least three pounds more, or two hundred and six and two hundred and eleven pounds. Now, it must be remembered, that these cows are not *selected for trial* out of a herd, but are *all the cows for twelve years*, and all born and raised upon my own place, thus affording a fairer and more reliable test of the

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NOTE.—In 1865, from changes of cattle, no fair statement can be given; while in 1863, 1864, 1868 and 1870, there were in each from two to three heifers with their first calves, and in 1870, the long drought and hot weather, materially reduced the amount of milk.

qualities of the breed, as to health and butter making capacity. I am not able to find any account which shows as good a result from any breed of cattle. Many single cows of my own and from other herds, both of Channel Island and other cattle, have far exceded these amounts of butter, but the value of a breed cannot be gauged by exceptions or by experiments with high feeding, which must soon exhaust the animal so over stimulated.

CHARLES R. KING.

CHELWOOD, *Bucks county, Pa.,*
April 3, 1871.

THE CRANBERRY AND ITS CULTURE.

BY A. H. RICHARDS, PHILADELPHIA.

GENERAL VIEWS, SOIL, &C.

Observation and experience have demonstrated the essentials of Cranberry Culture. There has been sufficient done to thoroughly test different soils and modes of cultivation. Sufficient time has elapsed since the commencement of experiments to enable us to lay down clearly the characteristics of Perennial Cranberry Lands, and the requisites and modes of attaining a lasting profitable culture of the vine. The results of the many experiences may be briefly stated as follows:—A fine clear white sand, well mixed with "peat or muck;" a bountiful supply of water; a stratum of pure muck underlying the meadow; winter flooding and a meadow kept free of all foreign growth.

Wild Cranberry lands are in superficial appearance very unpromising. They are generally covered by a knee high bush, called "Prim," a spongy turf or coarse sod of rank wild grasses, scattered clumps and tussocks of bush, the stumps and debris of cedar swamps, or scattered stunted pine and cedar straggling over the level. In winter, they become shallow ponds of water, sometimes called "winter ponds." The surrounding country a white sand, covered with stunted pitch pine, scrub oak, huckelberry, and laurel, and is altogether of a forbidding barren appearance. Beneath the spongy turf, rank sod, or in the swamp bottom, there lies a rich deposit of peat, from a few inches to many feet in depth. These winter ponds contain the accumulated washings of decayed vegetation, from the surrounding country miles back, for ages past. This accumulation is the undoubted food of the Cranberry plant. A stratum of this peat on the bottom of the meadow, itself shaded by a light covering of sand, holds moisture (like dough or clay protected) and furnishes nutriment to the vine. All yellow loam in contact (mixed) with muck becomes very prolific in grasses, so much so as to choke out the vine. Very coarse sand, and gravelly soils pack, and bake too hard in dry weather, thereby preventing the small rootlets of the vine penetrating and reaching food and water beneath. The two latter soils should be avoided. Careful observation in this matter is essential to success. Some good Cranberry lands are of a springy nature, the moisture constantly welling up in small pools; or evaporating through the surface sod—such are mostly found on the banks of streams. The best Cranberry lands are the deep peat deposits, such as have one foot or more of clear peat on the bottom of the meadow.

White sand, in ridges of five or six feet in height, lie around and along these winter ponds, being the wind drifts and washings of the finer particles from the surrounding country. They are generally (but not always) of the character most desirable for the top covering of the meadow. This sand is a fine sparkling quartz, containing but little foreign matter, and serves the purpose of a shade perfectly; being white and bright, it reflects much and absorbs little heat.

No less authority than Prof. Agassiz assures us that not only is Silica indispensable to the developement of the plant, but that it *cannot* flourish in loamy or gravelly "drift" soils. The harshness of touch distinguishing the bearing vine, he ascribes to the large proportion of Silica contained in its leaf. Thus pure fine white sand becomes, with muck and water, the material out of which the vine must form its growth.

These ponds being in a very level country, a small ditch or obstacle will often throw the current of water to the right hand or left as we may desire. A dam of from two to six feet in height will often flood a large scope of meadow, sometimes one hundred or even two hundred acres. To obtain an average depth of water, say eighteen inches, over the vine, does not require much outlay. In order to make flooding as uniform in depth as possible, and to hold it at its proper level in the ditches, some grading will often be needed. This should be taken into account in the selection of lands. Dry land for a superintendent's residence, stables, fruit and barrel houses, pickers' booths, &c., all require attention at the beginning.

The barren appearance of the country ought not to influence the judgment. If we would successfully raise Cranberries, it is indispensable that we go to those places nature has assigned for them. The best and most valued Cranberry meadows to-day, such as would command $1,500 per acre at least, were, previous to successful cultivation, considered valueless, often allowed to go untaxed, for want of any ascertainable use for or value to put upon them. So long held in disrepute, these lands are now, however, well appreciated, and are taxed according to their production or intrinsic value.

In one case, when they first came on the assessment book, the Cranberry raiser proposed to assess his meadow at twice the value of the best farm in the township, the proposition was accepted, and gave general satisfaction; and in various ways a value has been reached without complaint. Many of the best of these lands have been already taken up, and are out of market. The great extent of wild lands in south and east Jersey, has given the impression that the amount of Cranberry land is almost unlimited. To this impression has been added another equally erroneous—the wild Cranberry vine, being found in small detached places scattered about the country almost everywhere, it has been inferred the fruit can be cultivated *anywhere*.

The spaces between the main water courses of Jersey are of the yellow gravelly loam, grass bearing soils; along these higher levels the farms and gardens have been laid out. There are, generally speaking, no Cranberry soils among the loam regions. The Cranberry lands lie along the smaller water courses and among the heads of such streams, and are by many feet on a lower level. The proportions of bona fide Cranberry soils to those totally unfit, is about as one square mile to perhaps one thousand miles; in fact, out of about twenty thousand or more square miles of region in which the vine is indigeneous, it would be difficult to find that proportion of such land that a Cranberry grower would waste a day or a dollar in the culture of. There are most probably not thirty thousand acres of bona fide Cranberry land in New Jersey.

The climate of the Atlantic slope as well as the soil of south Jersey, seems to be peculiarly adapted to developing this fruit in its highest perfection. The contiguity of the ocean modifies the early winter, and we have hoar frost in place of ice. This hoar frost and backward winter is vastly to our advantage, as it ripens, colors and perfects the fruit without the least injury; on the contrary improving it very much. Harvesting may be carried two or three weeks later into the season than to the north, and commenced earlier if desired, giving an option as to what precise condition we gather in, and allowing more time to examine the market. The summers, though often hot, are not the long continued heat of the south. In North Carolina the fruit dries up on the vine from this long heat.

For man there is no more healthful and invigorating climate on the Atlantic coast, or one freer from miasma and local disease than that of south Jersey. The streams furnish access by vessels to New York, the railroads to Philadelphia, thus being placed between the two largest markets of the continent, both of which are shipping ports and are connected directly by rail with the east, south and Pacific. The supply of labor in this section is abundant; many of the laborers being experts in the preparation of Cranberry bogs. Stores, mills, smith's shops, &c., are scattered through this region, and anything not to be had in the country, can be got in Philadelphia or New York, in from twenty-four to forty-eight hours.

PREPARATION OF LAND, DAMS, &C.

In the preparation of wild land, the first operation will be to so ditch or fend off the water that it will be accessible at all times. Clearing may now with advantage begin.

It is necessary to give the vine full and entire possession of the soil, for it is slow of growth and easily checked by foreign matters when first forming its root. The whole body of turf, sod, tussock, stump or grub must be entirely removed off from the ground. The coarser kinds of plants growing on these meadows spring up anew, from root or cutting left on the ground. No plow or other tool has been found to accomplish this removal of the turf or sod effectually, and hand work must be resorted to. The turfing axe and hoe are indispensable. The whole wild surface must be chopped up and removed, root and stem, to the clear muck below, grubbers following, as the land is cleared.

Fire, when the season will permit, will save much hauling off. But generally a movable track and car are required to move the turf off and haul sand on. A wheelbarrow becomes too expensive and laborious over distances of more than ten rods. The grubs are allowed to dry, and are burned on the ground. The turf or floats, as they are termed, make a capital wall, securely enclosing the meadow from pigs, cattle, &c.

A wall should not be less than eight feet on the bottom, by seven feet high, and battered six inches on the inside; ten or twelve rods of surface will build one rod standing of wall. The turf should be cut of uniform size, say eighteen inches by two feet, and laid up, breaking joint, as brick work, with an occasional course of stretchers or binders. In laying out the wall, sand sufficient to cover the muck four to five inches and fill the hollows and bring to a uniform grade, had better be included within the enclosure. A wagon road round the inside of the meadow often become useful in harvest.

These turf walls generally settle from one to two feet in a few years, and if the turf is very light and spongy even three feet. If we have plenty of turf, a wall will pay ten to twelve feet wide, and as high as the turf can be readily handled, say nine feet. On such a wall a road may be constructed, and thus avoid the necessity of driving over the meadow in carting off the crop. The out faces of such walls will soon cover with a growth from the turf, while the interior gradually moulders into a very valuable manure, worth to any farmer re-placing with a first-class rail fence. Where there is not much wash against the wall, while the meadow is under water, a hearting of sand may be used in place of a dam. In the middle of the wall, as laid out, clear off the surface down to clean sand, free from roots, &c., to a width of not less than two feet, three or four is better, fill this heart with clean sand as the wall goes up to the desired height, and go on with the wall as before; always taking care to have at least four feet of turf on each side of the sand heart. A ditch, three or four feet from the foot of the wall on the inside, and of sufficient width, will furnish material for the heart, while the ditch can be made available in flooding and draining the meadow. A wall built as above is good for at least ten years, without repairs.

When the layer of muck beneath the sod is not more than six to eight inches thick in depth, and the clear white sand immediately under it, the sand may be thrown on the top and the muck beneath, by a heavy plow and yoke of oxen.

When the peat is of considerable depth, a movable track and car is by all means the quickest and most economical for running the turf off and the sand on. A plank walk may be laid down, and a mule used to draw the car. Scantling of three by four inches and twelve feet long, makes the best track; the sections fitting between the standards of an ordinary farm wagon, it is easily moved over long distances. The sand is generally spread by shovel from the car; some dump it and spread after. The former makes the most uniform and best work.

The meadow now being ditched, walled, cleared, levelled and sanded, planting may be commenced. But, as these operations will require a full season, and spring being the best planting period, many leave the ditches open, keeping the water off the surface, and allowing the frost and rain to pulverize lumps and settle the whole.

The flood-gates are generally put in after planting, in the second year, in the driest weather. Great care is necessary in filling the mud and face sills and the wings; a very insignificant leak washes the fine sands, till at last the whole gates "blow out."

All new sand dams should be laid up in the commencement of the season, and allowed as much time as possible to settle before water is raised on them; which should be done, at first, an inch a day, thus settling the whole uniformly from bottom to top. Turf makes a good face to a dam. A dam (sand) holding six feet of water, should be ten feet wide on top to be safe, and well backed by turf wall. Hand-gates are sufficient to vent any excess of water, the width of overflow being proportioned to the amount of water coming down; they will not often be used.

TOOLS, DITCHES, &C.

The tools most used in turfing are the axe and hoe. The axe is a steel plate, twelve by eight inches, and one-sixteenth of an inch thick. On lands that will bear a horse, a revolving cutter will save much. A circular saw, with its teeth broken off, and ground down to an edge, revolving on a pivot through a heavy piece of oak timber, four by six inches, and five feet long, with a pair of plow handles on the opposite end, and used as a plow, where the turf is not too thick, will cut it in blocks, dispensing with the axe. A man follows with the turf hoe, cutting under the blocks and turning them upside down, to dry, making a lighter weight to carry out of the meadow or build into a wall, and drying them for the fire.

When it is desirable to burn the turf, after drying, make a dome of the turf, say four feet high, leaving in the centre a chamber, say two feet in diameter, and an air passage out to windward. Stock the chamber well with dry kindling, fat pine, &c., fire the kindling, and when the whole becomes thoroughly ignited and the smoke pours out through all parts of the dome, close up the air passage with turf, and put on turf over every crevice where smoke or flame appears, and proceed as if you meant to smother rather than feed the fire. A distance of two to three rods around each fire may be thus burned. Two or three such fires are as much as one man can keep up. Dry weather and a fresh breeze are best for fires. Rain does not easily extinguish them, when properly made. When a good heat has been got in the heart of the pit, turf may be piled on to any convenient height. A fire may thus be kept up for weeks. The ash left is, when unleached, very light; throw it up into the breeze and let the wind spread it, and we get probably the best known stimulant to the growth of the new plant.

If a ditch is but six inches deep, it should not be less than three feet wide on the top and eighteen inches on the bottom. The fine sands will wash in and choke up a narrow ditch. The best general form for an interior ditch, and about the average dimensions of the ditches in use, are four feet wide at the top, eighteen inches on the bottom, and eighteen inches deep. Under drains and closed ditches always choke up with sand. In nearly all "winter ponds," a slight tilt will be found, a point to which all or nearly all the water may be brought; this point should be carefully and certainly ascertained and used as the main drain of the meadow. From such a main stem a system of drains can be laid off.

The Cranberry lands are generally so nearly level that a small difference in level may make a very great difference in the flow of water, and great care should be taken in fixing this point. After draining off the meadow in the spring, no water should be allowed to stand on the surface. The system of ditches should carry off quickly all surface water; for the vine, the blossom and fruit are easily scalded by a few hours hot sun on a shallow pool of water, such as may be left by a passing shower. During the harvest, the surface of the meadow should be as dry as possible. The pickers cannot do themselves or their employers justice, where they are compelled to gather in water.

Water kept at a uniform level of from four to six inches below the surface in the ditches, until about two or three weeks before the harvest, is very desirable. For the harvest we want everything dry. All these objects are attainable in many of our Cranberry lands. Careful observation before commencing and as careful watching during the work, will bring to light many facts to turn to our advantage.

GROWTH OF THE VINE.

The Cranberry vine resembles the strawberry and the grape—the strawberry in its running and the grape in its fruiting.

Its root does not penetrate the soil much over three or four inches. The mass of its root lies (when the vine is at its maturity, say six or seven years old) about from one-half inch below the surface, downward about two and a half inches. The roots spread out like a mat (and may be rolled up as one) over the point where the sand and muck mix, in a proportion of about one-half and one-half, underlying the whole surface of the meadow. From this body of root, a host of tender fibres run down into the peat and moisture. The vine stools out from the original plant, and also throws out runners along the ground, crossing and interlacing one another over the whole surface. From the eyes on the runners touching the ground, new roots are thrown out; from the eyes on the upper side shoots spring up Where the soil is congenial, these shoots are very numerous, sometimes every eye throwing out a shoot; where the soil is barren, a runner may be seen twenty feet long with scarcely a branch or shoot on it.

The first year's growth of the vine is cellular. When the sap has been driven down by cold, the cellular formation becomes fibrous—a true wood. It is from this latter *woody stem* that bloom and fruit are produced. The mode of fruiting is, from a growth out of a small bud, in the very top of the stem or shoot. The bud opens, and a growth (cellular) of from one and a half to three inches rises from it. By July this growth is complete, and the small eyes on this *new growth*, just above where the bud out of which it grew had been swells and throws out the flower, at the base of which the fruit forms. Above the fruit eyes we have leaves and a fresh bud on its top, for next year's shoot, flower and fruit. One stem will fruit in this way three or four years successively. During the flowering and setting of the fruit, the vine is very delicate and makes little or no growth. After the fruit has attained the size of a pea, the growth of the vine begins again.

The latter or fall growth is confined mostly to the runners, which next spring send up shoots, to bear fruit the year following. After three or four years, these stems, now eight or ten inches long, die, and we have a collection of dead wood among our vines. But in the harvesting, the stems being very brittle, are broken by the pickers working over the meadow, and as we raise water for winter flooding, large quantities of this dead wood will float away, and thus to a great extent clear off the ground, so that new runners may come in contact with it, rooting, sending up new shoots, &c., as before.

There are several varieties of wild vines. The "Cherry" and the "Bell," so named from the shape of the fruit, being preferred for cultivation. The most common vine does not perfect its fruit till some days after a hoar-frost, or early in October; another does not flower till September, its fruit never maturing in quantity. There is a difference in size, quality and flavor of fruit produced by different vines; but so little attention has been given or so little made known to the public, that much cannot be said with certainty on this branch of the subject. A reliable vine, however, can always be got from some of the cultivated meadows. The vines from the wild meadows are not now as pleanty or as reliable as those from the cultivated lands. Very little has been done in raising vines from seed, and a good field is open for experimenting in new varieties.

When the vine begins to grow old, say fifteen or sixteen years, and to be uncertain in its crop, mowing it over with a short, sharp scythe, as you would a field of clover, will leave the roots and runners free to renew the meadow. This mowing should be done immediately after harvest; but in a good meadow, a little raking and clearing out of the dead wood from year to year, is sufficient, and the process of renewal goes on annually.

PLANTING, WEEDING, &C.

The planting of the vine is a small part of the whole operation in putting out a meadow. The vines should be kept with their roots moist till ready for use—the more live roots we have on the plants, the more rapid and vigorous the growth. Three stakes in line to sight over, a dibbler or a light plow and hoe are all that is needed. Some plant in drills, canting the vines over at an angle of 45, and from three to four feet apart, or in drills two feet apart, the vines canted in opposite directions away from each other, each pair of drills four or six feet apart. The most common mode is the dibbler, holes, eighteen inches apart in the row, and rows three feet apart. The vine is set into the ground four to six inches, leaving as much above ground, the earth pressed *firmly around* the new set with the foot. The firm settling of the ground about the plant is important. Planting should, if possible, be done in the spring, as soon as the frost is out of the ground, say in March. Perhaps the most favorable month of all is May, and fine clear weather, with occasional short warm rains, seems to delight the plant.

The growth of the vine may be described as follows: The first year is spent in throwing out a body of root, and some stooling out; the second in stooling and sending out its runners; the third in putting out its shoots; in the fourth year the vine is ready to yield a crop.

Some fruit may be expected from the old stems and stools of the first and second year's growth in the third year. During the first two years it is best that the *whole strength* of the vine should be spent in growth, *and no fruit at all* is best for it and us.

In all new meadows, no matter how carefully they are prepared, there will be some growth of grass, bush, &c. During the first three years, this should be removed by *the root*, and carried out of the meadow. Women and children are the best hands for this. Care should be taken not to disturb the plants or runners. The use of hoe harrows is questionable, for the reason that they break and destroy much of the new tender growth.

During the first three years weeding should be kept up; in short, the general idea is, the vine being of slow growth and requiring a large amount of root, should have entire possession of the ground, allowing no foreign growth to absorb nourishment or check the spread of root and runner.

Winter flooding is our greatest aid in keeping back a large amount of wild growth; much it completely kills, and so backens the rest as to give us the mastery of it. For this reason alone, winter flooding is a necessity.

Some of these wild stuffs breed moth and worms, some choke and kill out the vine; cleaning by the root and flooding are the only specifics. For the first three years the cleaning may cost from one to five dollars a year per acre. So soon as the vine is in full possession of the ground and has well rooted, it will crowd out most wild grasses, &c. Cleaning twice a year will suffice now, once in the spring, when the young shoots and leaf put out from the weeds, and again in the fall, after picking.

The vine is very delicate during the blooming season, and should not even be walked among. If necessary to do so, go barefooted. After picking, an old meadow is benefited by walking over and weeding. A slight disturbance and breaking of the dead wood enables it to float off. No rake or harrow has as yet proved a success—it destroys more living vine than it removes of dead.

Turkeys and Guinea fowls are very good insect destroyers. Grasshoppers and the caterpillar bred from Kill Calf, and other weeds are removed by them. The Kill Calf being weeded out, this caterpillar disappears with it. Webbing, another worm, a small green skipper, (resembling cheese skippers,) is prevented by proper flooding; if not eradicated by these means, cut with a knife all the vines affected, close to the ground, and burn the cuttings out of the meadow.

PICKING AND MARKETING.

Gathering and shipping a crop of some thousands of bushels will be found to require close attention and great care. A great variety of scoops, rakes, &c., have been tried, but all tear and destroy so much that they have been abandoned, and hand picking is the rule. Women and children are the best pickers; the best party is a woman with four children, two on each wing, so that she may overlook the whole. Such a party earned, at fifty cents per bushel, $98 75 in fifteen and a-half days.

This harvest, being the last fruit harvest, is valuable to the pickers, as it puts them in funds for the winter. About one hundred pickers are as many as one boss can superintend, *i. e.*, stake out lots for and see that they are picked clean, &c. Each party of pickers should have a lot assigned them, (three stakes in line makes sufficient boundary between lots,) their box, basket or barrel, which should be of uniform measure, sits at the end of their lot, with their number conspicuously on it, they picking in small buckets, and emptying into the other. When filled it is taken away by the boss, and the amount credited to that picker's number. Numbers should be used in place of names, each one keeping the same number through the harvest. The name being entered in the book adjoining the number, a settlement can be had with each one in a few minutes.

By having living booths on the grounds it will be found that those living close by the side of their work will average one-third more per day than those coming from even one mile distance. From forty to fifty cents per bushel is at present paid for picking. The ground being dry, the harvester may sit or kneel at ease while at work. The season and climate are pleasant, and the harvest becomes the least fatiguing, pleasantest and most profitable of any of the year. It is regarded equally as a pleasure and a labor. Conversation, singing, &c., enliven the work.

The fruit is sent to market in boxes of one and one and a half bushels, and in barrels of two and seven-tenths bushels. While filling, shake and settle down the fruit firmly, so that they do not rattle or bruise in transportation. The barrel is preferable, all things considered, and uniformity in size throughout the whole State is very desirable. The Cranberry measure is the standard half bushel, poured on light and heaped as long as a berry will stay on the heap. A neat clean package that opens well filled commands the readiest sale.

Cranberries under water keep a long time, even years, if the water be running or is frequently changed, but when taken out should be cooked at once. Kept dry, they for the first two or three weeks go through a *sweat*, after which they shrink a little in measure, but do not decay rapidly till the approach of warm weather. A bin with a basket work bottom, of any convenient width, sides of the same or slatted, allowing all ventilation possible, and filled to a depth of not more than eight inches, kept free from frost, but cool and ventilated every fine day, will preserve the fruit far into spring. About twenty-five per cent. in measure is lost by keeping the crop through the winter.

Fruit conserving houses may be erected on the grounds, and shipments made from time to time according to order. One or two sortings during the winter, throwing out the decayed berries, is desirable. Crops vary in their tendency to decay; generally a wet season produces a large, watery berry, subject to rot, while in a dry season these conditions are reversed.

During July and August there sometimes occurs a short spell of intensely hot sun. Its power does not seem to be accurately measured by the thermometer. The evaporation rises from the ground so hot as apparently to parboil the fruit next the ground. In wet seasons, and on dews and after rains, a hot sunburst sometimes spots with rot the fruit at the top of the vine. The pickers should be taught to leave these and gather only the good berries. When mixed in the packages the rot spreads rapidly. A hoar frost ripens, colors and perfects the fruit, gives it its purple black color and the down on its skin, and ripens the seed in which much of the flavor is. A frost that congeals the juices of the fruit, leaves it, after a thaw, soft and liable to decay. If cooked within a week or two it makes the best of sauce or pie, only surpassed by fruit kept on the vine all winter, under water, called the "Spring Cranberry," the most delicate and delightful of all.

The supply of pickers may be considered unlimited as long as population increases. There are thousands in the cities who, if they could earn only a bare living, would be thankful for and be benefited by four to six weeks of the splendid healthful autumns of the Jersey pines.

Keep order among the pickers; let it be seen by all that this harvest is an honorable as well as profitable employment, and there will be no lack of hands. At present the supply is abundant, and the half of that supply not yet brought out.

MANURES AND FLOODING.

The manures of the Cranberry have not been very much examined into. The ash from burned turf, spread unleached lightly over as a top dressing, stimulates and invigorates for several years; while the ash of oak, containing a much stronger alkali, seems to retard for two or three years. The vine growing luxuriantly about a decaying pine stump or log, suggested the use of pine saw dust as a top dressing. After several heavy crops, a meadow will sometimes show bald spots and thin places; taking the dead wood out and spreading decomposed turf (four or five years old) over such places, stimulates the shoots, and the next season we have them covered with a fresh good growth. A top dressing of ashes and rotten muck assists in destroying the Skipper worm. Any light ash, as from pine, bush, &c., is good. Phosphates, guanoes, &c., stimulate growth at the expense of fruit; lime and salt have been pronounced injurious. In a new meadow, where the top is very clean pure sand, after the first year, a top dressing of rotten turf assists the runners. But generally, the manure of the vine is in the soil, and little addition is needed beyond, as mentioned above.

The dark colored waters of South Jersey, while standing at rest as when frozen over, send down a deposit of this muck. In drawing off the water from the meadow, it should be done gradually and on the approach of a rain, so that this deposit of manure may be washed from the leaves and vine and settled into the soil; thus winter flooding manures the meadow annually. In all artificial applications of muck, the muck used should have been some three to five years in pile, exposed to the changes of season and weather, or well rotted and pulverized.

YIELD, EXPENSE, CONSUMPTION, &C.

The yield per acre varies from meadow to meadow, and from season to season. From an experience of eleven years, it seems to be fair to say that a good muck bottom meadow should *average*, any ten years, one hundred bushels per acre per annum. The "Savannah" meadow often equals or surpasses in a single crop the other, but its yield is not so reliable. These figures are considered by many cultivators as too low.

The essential features of the Savannah are precisely the same as the other. It not having the amount of peat and moisture underlying, renders it more liable to effects of drought. There is generally difficulty in keeping the water in the ditches standing late into the summer. The muck meadow slightly rises or sinks as the muck is more or less saturated with water, self-regulating as it were. Some parts of the meadow bear wonderfully, four to five hundred bushels per acre, generally over a limited number of rods; these prolific spots change from place to place in the same meadow, in a totally unaccountable manner. Two or three heavy crops seem to exhaust those spots; they should be watched and the dead wood removed, to allow the new shoots free growth. A growth of vine from six to eight inches in height and sufficiently open to allow sun and air free access to all the fruit, produces the best paying yield. Too thick a growth makes too many white fruit, depreciating the price two to three dollars per barrel.

The consumption of this fruit is vastly increasing. A merchant who made it a specialty did well, eight or ten years ago, to sell two to four hundred barrels; now he may think little of selling four or five thousand barrels. There never has been a season when at some time there was not a demand and no fruit to meet it.

Very high prices ($25, and even $50 per barrel has been reached) confine the market to the opulent. The true customer of the cranberry grower is the artisan, mechanic and people of comfortable but limited circumstances. The readiest market is at from ten to fifteen dollars per barrel. At these rates they can be shipped to a distance and sold so as to pay for the transport.

As an anti-scorbutic and aid to digestion there is nothing to equal this fruit. All those living on salt meat, or lard in cakes and pasties, crave it and need it. The demand for it is based on the laws of nature, and it is not a mere luxury, so that it need not be feared that fashion or caprice will destroy the market. As to the extent of the market, of the forty millions of our people perhaps one-half could not, if they would, procure a quart of cranberries in a year. The miners of the west, people of the south, and large numbers to the eastward of the Alleghenies, have yet to become acquainted with its qualities and flavor. As for a foreign market, there is time enough for that when the domestic market becomes overstocked. At the present growth of the United States, it will require a generation at least to satisfy the home demand.

It is only within the last eight or ten years that the production has been sufficient to give the sales a standard place in the produce business. During this time sales have grown on the hands of commission men from hundreds of barrels to thousands. Boston fruit (the principal article then in market) sold, ten years ago, at six and eight dollars per barrel. The great improvement in quality, by the introduction of the cultivated Jersey fruit, and the rapidly increasing demand, have combined to carry prices to their present level, (1869–70)—say twelve to fifteen dollars.

In the commencement of the season there often is an apparent glut in market, but it should be remembered that the partly ripened New England crop, the wild and all sorts of defective crops, are thrust forward then. A couple of months generally rots off and disposes of all this, and the sound Jersey fruit is in demand.

EXPENSE.

The first cost of muck meadow, sanded, planted, dams built and gates set, complete, will be from $350 per acre up to $700, depending upon the character of the land selected. Savannah land can be put out complete for from $150 to $250 per acre. A house for the superintendent, with stable, and in due time barrel houses, picking booths, and the many et ceteras, will, if added to the cost per acre of the meadow, increase the above figures accordingly as we design. If we build permanent structures, the first cost increases; with temporary buildings the cost of renewal is almost annual, and in the long run the greatest. To put it in round figures, the cost of deep meadow will average about $500 per acre before we begin to derive any income; Savannah about $300.

It is believed that a strict Dr. and Cr. account, kept from the commencement with a meadow, will show that the cost of placing a barrel of Cranberries in Philadelphia or New York market, charging the crop with the present rates of freights, commission, &c., will not fall below $7 per barrel.

Cranberries at $12 per barrel, costing $7, (inclusive of interest on investment,) leaves us a margin of $5, or about $1 85 per bushel, a very handsome return certainly, but as certainly deserved from its tardy coming and the long years of constant outlay and patient waiting gone before.

Cranberry growing is a business requiring the immediate constant presence of some *one* competent man whose word is authority. A really good superintendent is worth much to any meadow—it is becoming almost a profession. In general it will require *one full year* for a superintendent to become thorough in his knowledge of any one given meadow. When found to be master of the details and competent throughout, he should have ample authority to carry out his views.

In private enterprise each one is accountable to himself only; but in the large company, meadows of from two to four hundred acres, a great part of the success of the enterprise will rest on the knowledge and fidelity of the superintendent.

Like the limestone districts and all other first-class lands, whether mineral or agricultural, the true Cranberry meadow will always command a price and pay a profit. Time will, no doubt, obliterate many ill-advised undertakings, leaving the intrinsically good on a sounder footing than ever.

The great increase in the consumption of fruit in this country can only be accounted for by the increase of the cities, towns, manufactures, &c., or of the non-agricultural part of our people. They are all fruit consumers, both on the score of economy and health. Our artisans and mechanics live well. Their wages admit of a healthful reasonable allowance of the good things of the country, and their wives have the ambition to furnish the table with them.

If this view be correct, there can be little hesitation in making up one's mind as to the future of the Cranberry crop.

The Cranberry of Sweden and Russia are smaller and more pungent and acid than ours; the Scotch is bitter; the Cranberry of the Pacific resembles the Scotch. All these have been used to a limited extent in Europe, and have never gained favor there.

Some years ago an American gentleman took to Messrs. Cross & Blackwell, of London, a barrel of first-rate Jersey fruit. Such an article or anything like it had never been seen in Europe before, so said Messrs. Cross & Blackwell.

Although it may require some time to accomplish, but from the increasing communication between the continents, (we having the only acceptable article,) there can be little doubt that the Jersey cranberry will become, in time, as well appreciated abroad as at home.

ADDRESS OF SENATOR COWAN,

(OF WESTMORELAND,)

Delivered at Williamsport, before the Pennsylvania State Agricultural Society, in 1865.

MY FRIENDS:—In presuming to address you to-day, I shall not attempt to instruct you in your calling—in the practical details of which you are much better versed than I could pretend to be. In that branch of Human Knowledge, it would be far more fit that I should be your pupil, than that I should assume to be your teacher.

I hope, too, that I may not be thought to disparage your occupation, in believing that your success in it depends much more upon your care and industry in applying that knowledge easily within the reach of all, than in having a large stock of learning, which from its very nature can only be acquired by a few. This is a wise dispensation of Providence, because if it were not possible for a man to be a good farmer, without he had first been taught Botany, Chemistry, Mineralogy, and other sciences bearing upon a proper cultivation of the soil, the world would be often times sadly in lack of bread. As a man may be a very good Christian without being a profound Theologian, so I suppose he may be a very good Farmer without being a very great Philosopher.

On the other hand, I do not wish to be understood to undervalue the labors of scientific men in their efforts to aid you. Very far from it. I think they are of the greatest possible use to you in furnishing you results at which you could not arrive without them. They construct the hypothesis, and you verify it; they propound the theory, and you enjoy the fruits of its realization, and by this division of labor between you and them, both are enabled the better to perform their parts.

CHANGE is the universal law, and although slow, there is still progress from a worse to a better state of things. The earth is continually improved by the evolution of newer and more useful forms out of the old—since the Carboniferous Era there is an entirely new Flora—the Fern being almost the only survivor of that age. The roses, the nightshades, the grasses and all the plants of most use are recent. The rose family furnishes us fruits, such as apples, peaches, pears, plums, cherries, blackberries, &c.; the nightshades give us the potato, tomato, tobacco, egg-plant and red peppers; the grasses feed us with wheat, rye, corn, oats, &c.; all these are staples, and superior to the ancient plants by far for our purposes. The animal kingdom too has changed, and instead of a population of horrid reptiles as in the Saurian age, the horse, the cow, the camel, the sheep, and others are here, crowned by the master wonder of all, Man. Surely in this change there has been progress and improvement, but these, too, are not stationary or permanent in their condition. Man himself changes; slowly emerges out of his original barbarism, and in the lapse of ages becomes an entirely different being.

At first a naked savage, and the most helpless of all animals, he has become the master of all by virtue of his superior reason, which enabled him to supplement himself in everything he wanted. Without strength, he became the strongest; without swiftness, he became the fleetest; and without means of attack, he became the most dangerous. He did all this by means of weapons or *tools;* he is the only animal that uses tools. He multiplied the strength of his arm by the club, and the handle of his spear was longer than the horn of the buffalo. His arrow-head was sharper than the panther's tooth, and his bow sent it afar from his hiding place. He was soon a conqueror with these rude engines, and he has gone on from the first, slowly and surely extending his dominion. The first age of his history has been called the *Stone Age*, because he made his tools of stone, such as axes, knives, spear-heads, &c.; and these are yet found on his ancient battle fields, near his quarries, and in the ruins of his encampments and villages, to tell us of the poverty of his condition. It is more than likely, too, that even thus early he domesticated certain animals, such as the horse, ass, ox and camel, in order to aid him in going from place to place, and carrying burdens. Perhaps, too, he found that he could grow certain plants useful to him, but his agriculture was of little account.

When this country was first discovered, the North American Indians were living in the condition I have mentioned, so that we can have a tolerably clear idea of the life of our ancestors thousands of years ago, when they commenced their career of conquest. I have no doubt they rejoiced, as we now do, over their new inventions, hailing the bow and arrow as Christians did gunpowder, and boasting of the horse as we do of the steam engine. How the desert tribes exulted when they found the capacity and endurance of the camel, with his extra stomach to carry water to last from station to station, we cannot tell; but we can suppose they were not insensible to his value then, more than to-day, when the tinkling of his caravan bell is heard in all the fairs of the Eastern world. The reindeer of the Laplander, the dog of the Esquimaux, and the lama of the Peruvian, all were important to them in the same way, and required new tools and new contrivances—saddles for beasts of burden—harness and sledges for beasts of draught—so that life was not without work to do even in the age of stone tools and animal forces.

Still the master races among them were not content to remain in this condition, and having discovered copper and tin, they made an alloy of these two metals, of which they then fabricated their weapons and tools. *Bronze* was a great improvement upon stone, for these purposes, from the ease with which it was cast and hammered into various shapes, and in the evenness and tenacity of the edge it carried. They could now mine in the quarries, hew timber in the forests, clear wide fields and cultivate them; they had Agriculture. Society was then organized into the State, which manifested itself in the building of cities, temples, roads, pyramids, palaces, &c., the remains of which still exist as monuments of their industry and ingenuity. This was called the *Age of Bronze*, and how far man could progress with tools of that metal, was well shown in Peru, when the Spaniards first discovered that country. They were struggling with the same imperfect tools used by the Egyptians and Assyrians, thousands of years before, and every thing among them seemed to wear much the same aspect as the civilization of the East in the earlier times. It is evident they understood many of the modes of applying the mechanical forces, from the ponderous weights they were enabled to transport, and the great works they erected. Still their contrivances were rude, and they made up for their deficiencies by an enormous expenditure of labor and patience, to achieve results now obtained with very little trouble. It is not certain, but I think it probable they knew of the power of the wind to drive their boats and ships, but the uses of the water-fall, as a mehanical agent, was not yet discovered.

But the next discovery, and the one which has exercised by far the most important influence in all departments of human life, was that of *Iron;* and being the most abundant of all the metals, and combining all the qualities of strength, hardness and durability, it has superseded the bronze, and is everywhere used as the material par excellence for tools.

Never, or very rarely, found in a pure state, and its ores bearing little or no resemblance to itself, it is difficult to conceive how it was first found out; perhaps by accident, at the edge of some volcano, as glass was found where a fire had been built on the sand and vetrified it. It is certain that it requires an intense heat to extract iron from its ore; and then afterwards, the processes it must undergo before it becomes available for its more refined purposes, are difficult and require great skill. A certain amount of progress in metallurgy was necessary before iron could be made, and the age of bronze served as a preparatory school for this. The savage never could have achieved it.

It is wonderful to think of the uses to which this metal is put, in industrial pursuits, all over the world. There is no work of any kind done in which it does not take part; the finest needle and the heaviest anchor—nay even the heaviest ships—are alike made of it. It is so intimately bound up with all the processes of life, that we can only estimate its importance by supposing ourselves deprived of it; take it away, and the world would come to a dead stop; we would be savages again, to a certain extent, in spite of ourselves. No wonder it has given its name to the present age.

Having material for tools in perfection, and having, by means of it, made great strides in adapting all things to their purposes, they still sought something more. The forces of men and animals were inadequate to the increased demand everywhere making for the products of labor. Human wants were still in excess of human capacity to supply them, and the idea of new forces began to dawn in ingenious minds. The ship is built, but it must be rowed from port to port; what if the wind could be made to waft it? Then the sail relieved the oar, and the oarman's bench was vacated. The women and the slaves ground the corn, but it was found the wind could turn the mill as well, and the water-fall a great deal better; and for two thousand years, perhaps, these were the inanimate forces used to perform the heaviest kinds of drudgery. Still, the operations performed were of the simplest kind, such as grinding, sawing, forging, &c., and they could only be performed on the spot where the power existed; and even then it was uncertain and irregular in its action.

There was still more wanting; machinery with a wider function, and a power to drive it certain and steady; not confined to any locality but to work anywhere and everywhere, in any given amount, and unaffected by any conditions beyond the control of the operator. In achieving this, we enter upon a new Era; the Era of Invention; and we stand now upon its threshold. Much as has been done, it is hardly yet inaugurated, for we must remember it all lies in the last hundred years. Before that time there were tools, but it could hardly be said that such a thing as industrial machinery existed.

Just two hundred years ago, in 1665, the Marquis of Worcester announced the discovery of "A MOST ADMIRABLE AND FORCIBLE WAY TO DRAW UP WATER BY FIRE." And this was perhaps the first time that FIRE was distinctly suggested as a mechanical force. It happened luckily, too, in the beginning, that it was associated with water as the best medium through which its force could be applied to industrial purposes. Nothing has since been found to answer the purpose so well, because, when the fire communicates its force to the water, expanding it into steam, this can be used the same as wind to drive machinery; with the additional advantage, that it can be deprived of its power in an instant by the ease with which it is condensed. Here, then, was a new slave born into the world, unlimited in its capacity for work, perfectly manageable in the hands of a skillful master, unaffected by the seasons and unwearied by continuous exertion.

This hint of Glamorgan, Marquis of Worcester, has grown to be by far the most important feature of modern civilization, and the man who struggled so loyally to save Charles I., the most faithless of tyrants, has inaugurated a new state of things, which is likely to be forever fatal to the divine right of Kings, by the impulse it has given to the common sense of mankind everywhere. The Watts, the Fultons, and the Stevensons, have been improving upon his hint, of doing things by fire, till there is hardly any thing which is not done by it. If a cotton crop is to be spun and woven, a fire is built to do it—if a great ship is to be driven across a wide ocean or up a rapid river, a fire is built to do it—and if a thousand tons of merchandise is to be carried across a continent, a fire is built, and this fire drags it with a speed that is marvelous. About the same time it became evident that fire was the agent by which the largest part of our work was to be done: it was question as to fuel, because it was very clear that the forests would not suffice for a long time to furnish it, as well as the lumber required for all the uses to which that article was put.

Here the discovery of coal came in to set at rest that question, and it was found the provision was ample for every contingency—indeed that all the forests of the earth, in remote geological ages, had been carefully presented—cut, ranked and stowed away in the most compact manner, apparently to meet it. Coal mines, when carefully examined by the best lights of science, showed themselves the repositories of vegetable matter, the remains of immense crops of trees and plants—compressed and covered up in the bowels of the earth, concealing them till the fullness of time. No wonder that men, in their sincerest moods of thankfulness, call God, Providence.

That such a commodity, so simple and easily tested, should have remained so long unknown in populous countries, as fuel, is most strange; yet it is the fact that in England, two hundred years ago, when wood was scarce, coal was but little used; while now, its consumption is so enormous as, in time, to threaten its exhaustion. So, too, in America, where there was once the largest forest on the globe, and wood plenty, coals are now everywhere used, and in a short time will supersede wood entirely. It exists everywhere, in almost all countries, more or less in quantity; but being of heavy carriage, and its transportation costly, those who have it at their doors must eventually enjoy such superior advantages as to make competition with them very difficult, in all operations where great power is wanted.

From this short retrospect of the past, it is not hard to understand the significance of the present; nor, perhaps, is it difficult to forsee the probable future. The first thing apparent as the result of this long and arduous struggle, is that the civilized man has procured for himself the best material on the globe for tools and machinery. It is not likely he will get any thing better than iron for these purposes; and although he may, and doubtless will, improve its quality very much, yet it will still be iron. Nor is it probable that he will find any cheaper or readier way to generate force to work them, than by fire; because heat is force, and heat is best obtained by combustion. Here, then, are two ultimates achieved; and his labors are, to a great extent, done in that direction which will leave the whole force of his intellect to expend itself upon *invention and contrivance.* Henceforth he will study the nature of the work to be done, and the operations to be performed, in order that they may be done and performed by means of machinery. This he will contrive so that it will attain the end; and I think I am warranted in saying, from what he has done already, that he will succeed. No man can doubt this, who will examine the inventions already made in almost every department of industry.

Another thing has been verified; that is, that the progress of improvement now goes on with a pace that is continually being accelerated; so that an imperfect piece of mechanism can no longer maintain its place, but must soon give way to another, freed from defects. As an example of this, you may take your own agricultural implements—say the plow. How soon the inventors of this age corrected the deficiencies of that one which had come down to them sanctified by two or three thousand years of blunders. Elisha was found plowing "with twelve yoke of oxen before him, and he with the twelfth." Was this one team, or a dozen? And yet this plow of Elisha was suffered to remain in its original rude and clumsy condition, without much amendment, till within the last hundred years. Observe, too, the continued efforts to improve threshing machines, reapers, mowers, &c. Every man brought in contact with them seems to think that it is his particular duty to suggest improvements. The sewing machine is another instance of the rapidity with which these contrivances are brought to comparative perfection. Indeed its appearance, and the suddenness with which it has come into general use, would almost incline one to think it was given in order to stifle the painful cry of pale and overtasked women, which found poetic embodiment in Hood's "Song of the Shirt." May not the song of the poet have awakened and inspired the genius of the mechanic?

I have said that the introduction of industrial machinery was of recent date, and I mean by this, *machinery* which of itself performs industrial operations, without any other aid from human hands than that which is necessary to bring the material to be fabricated within reach of the machine. The ancients do not seem to have had any notion such an achievement was possible; at least it would appear, from all we know of their works, that they did every thing by hand. Now, however, it is known that the hand itself can be rivalled, in flexibility of movement, by machinery; while for delicate exactness of execution, the latter far exceeds it. This can be multiplied at will to such an extent, and with such a cheapening of production, that in the case of many articles of necessity, they are brought all over the world, within reach even of the poorest people. This is a kind of progress that cannot be arrested, and produces a civilization unlike those of former ages, because it cannot be lost.

But you ask, what has all this to do with Agriculture? I confess the query is somewhat startling at first sight—still it is easily answered, by saying EVERYTHING. The farmers own the country and are, being the great bulk of the population, interested in its progress more than any other class. You have seen that IRON is the most important of all materials for industrial purposes—are not your hills and mountains filled with it? You have seen that FIRE is the force superior to all others to make things go. Who then has so much coal and can make fires as cheaply as you can? I mean then, not indeed that you should all turn manufacturers, but that enjoying, to an extraordinary extent, these two articles of prime necessity in modern industry, you should establish and encourage manufacturing pursuits as the readiest means of furnishing a market for your produce and of enriching our country.

It must be clear that from this time forward the great desideratum will be machinery, and whoever has the most, the best and the cheapest machinery will be able to do the most work and produce the most wealth. Now to encourage manufactures is not only to encourage the *use* of machinery—but to encourage the *invention and production* of it—and if there was no other reason, the farmer ought to do this in order to procure it for farm purposes. He is quite as much interested as any one else, that his work shall be done by it—not because it saves labor, but because it multiplies it infinitely and saves human toil and drudgery. He will require quite as many people to assist him as ever, perhaps a great many more, but each one will control ten, twenty or one hundred times as much power as at present, and thus do so much the more work and in the same degree increase production. The price or wages of labor will rise, too, because the value of man himself will rise, and you can better afford to pay an engineer to drive a machine of twenty horse power two dollars per day, than to pay your plowman one dollar for driving two horses. So that you see the laboring man will be the gainer too—he will get better wages, and as you can then produce much more at less cost, he will get cheaper bread. You have perhaps $250,000,000 worth of tools and machinery in the United States now, and you and the laborers are both better off than you would have been the old way, when a few dollars stocked the farm and your sinews and his did the rest.

Your horse has become far more valuable, too, because thirty years ago he could only drag and haul your burdens. Now, since he has learned to thresh, mow and reap, you prize him more highly. How curious to observe, too, that as soon as *invention* set coals or fire to do the carrying and hauling of commerce, which the horse used to do, that moment *invention* set him at the work you used to do, and both are quite as busy as before; but your work is of a nobler sort, and not so toilsome and exhaustive. All this, however, is but the beginning; and if you open your eyes and understand your advantages, invention will do a great deal more for you. Your hills and mountains, you know, are full of coal and iron; but they are also full of MANURE. Where do the rich soils of the river bottoms come from—the alluvials of the Susquehanna, the Ohio, the Mississippi? Surely from the highlands which they drain, and they leach them out and carry them down in floods to enrich the fields below. It is impossible to conceive of the amount of fertilizing matter carried by a great river—the Mississippi or the Nile, for instance. All the navies in the world, if sent to the guano islands, could not carry such a cargo. Some day you will be shown how to get these manures from the hills, just as you now get lime. Science will determine their qualities, and invention will dig, separate and prepare them; so that you can keep your soils in a condition to render you a harvest worthy of the age and its progress.

Then again, you, as farmers, are interested in this march of progress in another way. You are the owners of the great coal fields of the country, and it is only by an acquaintance with the leading characteristics of the age and its tendencies, that you can know their value, and the best way to develop them. Let us look for one moment at the comparative extent of your fields. Let the unit be 100 square miles; then the British islands will be represented by 54, and all Europe by 90. Would you be surprised to find that Pennsylvania alone has 126, or more than one-third more than all Europe? Again, the Apalachian coal field of Pennsylvania, Virginia, Maryland, Ohio, &c., has nearly six times all Europe, or 555; while the whole United States, with all its fields, has 2,000, or more than twenty-two times as much as Europe. You own mines of iron equally extensive, so that you see that in both of these leading materials you are more richly endowed than any other country. Why, then, should you not use them, and know how to use them?

It is evident that at some time or another, too, you must look to these mines, and the facilities they offer for manufacturing, in order to see if you cannot find there a market for your breadstuffs; in other words, a home market. Where do you expect to sell the produce of the great valley of the Mississippi, increasing as it is so rapidly, if you do not people your coal and iron districts with a population of consumers? You cannot sell any thing now worth mentioning to foreigners, except your cotton, which is just the thing you ought not to sell, seeing that of all raw materials it is the most important, and the one out of which the most money is now made. Of this wonderful product you, too, have a kind of monopoly, producing five millions of bales in 1860—enough to employ one-half the nation in working it up.

Our circumstances at this time, too, render it incumbent upon us to be up and doing; as before the commencement of the war we had about twenty years of a run of luck, which we are not likely to enjoy again. The American farmer profited by it in a remarkable degree. It commenced by a famine in many parts of Europe, owing to the failure of the potato crops, which then was the chief subsistence of the poor. Great Britain was awakened by it to a more thorough consideration of her corn laws; they were repealed, and her markets were opened to your bread stuffs. Having protected her industry by her tariffs till it was beyond competition, she now recommends free trade to her neighbors who cannot afford it.

About this time, too, an immense network of railroads began to be built everywhere, and a large amount of labor was withdrawn from agricultural pursuits to build them. The discovery of the gold of California and Australia operated in the same way, taking thousands who would otherwise have been your competitors, and turning them into customers. This last event gave an unusual impulse to all kinds of business activity, precisely as the gold of Mexico and Peru moved the world two hundred years before, and stimulated the torper of the middle ages into progress in all directions.

The next fortunate event was the Crimean war, closing the grain ports of the Baltic and Black seas, leaving Dantzic and Odessa to yield the palm to Chicago, which from that time began to be the greatest mart in the world for grains.

Again, shortly after the treaty of Paris, another war occurred of advantage to us, because it kept one of our rivals with hands full for a time. This was the rebellion in India, and which at first threatened to deprive Great Britain of by far the richest of all her colonial possessions. It was hardly over when Austria, France and Italy again met in battle array in the Historic Square, and the great battles of Solferino and Magenta resulted in the kingdom of Italy.

Out of all these disturbances we had profits, because nothing gives an enterprising and energetic people such a chance for fortune as to find her neighbors exhausting their means and resources in war, while they are free to follow peaceful pursuits. Our history shows this; for while other nations were at war, we were accumulating wealth faster than it had ever been known to accumulate in the world before. Take the ten years between 1850 and 1860, and we had increased the value of our real and personal property from seven to sixteen thousand millions, and had put an area of more than three hundred and fifty miles square more under cultivation. We had more than doubled the cash value of our farms, and had nearly doubled the worth of our live stock. We raised seventy millions of bushels of wheat, six millions rye, twenty-six millions oats and two hundred and thirty-eight millions of bushels more of corn than in 1850. We also ginned two and a half millions of bales of cotton, and grew two hundred and thirty millions more pounds of tobacco than we did in the latter year, and we raised our manufactures proper from one thousand millions in 1850, to one thousand nine hundred millions in 1860. Think of it.

Up until this time we were fortunate and happy; but suddenly the scene changes, and instead of *peace* we have *war*, and the worst of wars—civil war. The elements of strife are unloosed, and death and destruction begin to hold carnival. The accumulations of years are swept away, commerce ruined, trade suspended, and the whole industry of the people on both sides is devoted to the production of the various implements of war. Guns, cannons, swords, powder and bullets are in demand; they need all they can make, and all they can buy. Enormous quantities of all kinds of military and naval stores are required; ships and forts are to be built, the whole, too, on a scale as extensive and magnificent as the most lavish outlay could command. The battle fields, too, were burdened with our people, wounded, maimed and dead; cities were destroyed, public works dismantled, and whole districts made desolate, so that the loss was incalculable.

Besides all this, in the very storm and smoke of the battle a great social revolution is going on; the very frame and texture of society is undergoing change in one-half the Union; in almost every house, and in almost every family, there must be new arrangements and a new state of things. More than three millions of slaves are made free; a nation of men, women and children, of another and a different race, rise suddenly up from the condition of property into liberty and independence, and the duties and responsibilities of their new position. They are utterly poor; not a dollar to start on; and thus born in the throes of war, they must, from hence, take care of themselves and make their own living. No event ever happened in the world operating a change of such magnitude as this, in so short a time and under such adverse circumstances. The exodus of the Israelites from Egypt has nothing to compare with it on the score of difficulty. In that case the Jews were in bondage, but it was only political bondage; they were slaves to Pharaoh, the King, and to him alone; they lived in Goshen by themselves, in a distinct, separate community; they had houses, families and property; they had society, organization and leaders; and they had miracle after miracle to break their chains; they had a miracle to destroy the host of Pharaoh which pursued them; and they had miracles to feed and support them till they reached a new country and a new home. The negro slaves, on the other hand, were the chattels of a people, the same as domestic animals, and not the mere vassals of a King, compelled to pay taxes by making bricks and building cities for him. They did not live in a community by themselves, but were part of the household of their masters, the same as his dogs and cattle; they had no homes but his; they had no families; they did not own their wives and children; they had no property, no society, no leaders, no organization of any kind; they had no miracle to aid them, unless the unaccountable madness and folly of their masters, in going to war about nothing, can be set down as such; they had no promised land to go to, but they had to rise from their bondage and remain in the face of their masters, to try, if possible, to cope with them in an independent struggle for existence. And yet these men, in their servile state, constituted the industry of the Southern States; by their aid it realized its wonderful increase of wealth. Now, however, all is necessarily chaos and confusion; the new order of things is not yet established, and the immense losses sustained are not yet repaired. Let us hope they soon will be.

In addition, however, to the losses suffered by the destruction of property, diversion of labor, ruin of commerce and diminution of trade, there yet remains another memento of it, to which I now propose to turn your attention, and that is the *National Debt*, which Mr. Stevens, in his Lancaster speech, thinks will amount to four thousand millions, but which I would fain hope will not exceed three thousand millions interest bearing debt.

Now I shall not inquire whether this debt is a national blessing or not; that depends upon the use we make of it. I think, however, it would be a greater blessing if we had it once paid; and it is to this task we must now devote ourselves. We have shown that we can maintain the national honor in the field, and I trust we will show ourselves equally able to keep it unsullied in the market.

We have incurred it in maintaining the supremacy of the Constitution and laws; and unless we now throw away the results, it was well expended. They are worth more to us, by far, than all else; and if we were to allow them to be violated with impunity, at the will of revolutionists, then all free government is at an end, and liberty, as we understand and prize it, impossible. There can be no liberty when the laws are not supreme.

After four years of struggle, waste and suffering, it is now incumbent upon us to see, if we can, in what way we can best relieve ourselves from debt and repair our losses. In doing this it is only proper that we should observe the same rules that you, as individuals would do, if in your private affairs you found it necessary to make a like investigation. The laws which govern the finances of nations are the same as those which govern in families.

First, then, as to our resources. In 1860 the estimated value of our real and personal property was a little over sixteen thousand millions, six thousand millions of which belonged to the seceding States, and ten thousand millions to the loyal States. How much remains to us now? I think the latter States have not depreciated; they may have wasted their increase and incurred debt, but I think their property is worth as much as in 1860. The rebel States are in a different condition; having been the theatre of war, they suffered much more loss in realized values than we did, and I suppose it is not far from wrong to say they are now worth but half as much as before, viz: three thousand millions, and that we both together have thirteen thousand millions for a new start, which is six thousand millions more than we had in 1850, when we had only seven thousand millions.

The next inquiry is, how much we can probably make, annually, out of this. Between 1850 and 1860 we increased our seven thousand millions up to sixteen thousand, or at the rate of nearly a thousand millions a year; but I have shown you the circumstances were very favorable to us, and as we had little or no taxes to pay, we were enabled to add all we made to existing capital. This we cannot do hereafter.

Besides this, the nations who were then at war are now at peace, and likely to be more formidable rivals, in all the industrial arts than before. Still, notwithstanding all these drawbacks, and looking to the general progress everywhere making, I believe we can, if fortunate, increase the value of our property two thousand millions per annum, or rather that sum minus our taxes; because out of our annual increase we must raise the revenues to carry on the government and pay the interest of our debt.

How much revenue will be required for that purpose? This is a question hard to answer at this time; but I think, from present appearances, three hundred and fifty millions will suffice, viz: one hundred and eighty millions to pay interest, one hundred millions for ordinary expenses, and seventy millions for extraordinary. Mr. Stevens, however, put the whole at four hundred and seventy millions. He may be right, but to avoid all appearance of exaggeration, I assume three hundred and fifty millions as the amount required.

Now if I should be right, it will require a little more than one-sixth of our annual gains to meet it. If, however, Mr. Stevens is right, then it will take a little less than one-fourth; or to speak more exactly, his estimate will take 23½ per cent. of our incomes and profits, while mine takes 17½ per cent. Now these are enormous taxes no doubt, and it only remains to decide, from the little experience we have had, how heavily they are likely to bear upon us.

Our present internal revenue system is of course imperfect in itself, and still more so from the difficulty of administering it with untrained officers, and a people entirely unaccustomed to such burdens as it imposes.

Notwithstanding, however, its figures so far give promise that it may be made to yield enough to prevent us after this year from further increasing our debt.

It will appear from the returns in the revenue office, that the collections for the six months ending 30th June, 1865, amounted to	$94,721,483 54
From 30th June till 20th September, inst	82,318,871 00
Estimate from 20th September till 1st January, 1866...	68,000,000 00
Total for the year 1865	245,040,354 54
If to this we add amount received from customs, say...	60,000,000 00
We will have a grand total of....................	305,040,354 54

This is perhaps as much as the most sanguine expected for this year, and we ought to note that some of the articles most productive, existed in such large quantities before the imposition of the present tax, so that as yet no great amounts have been realized from them. We have had also to encounter fraud and smuggling to an extent which cannot exist in the future, when the revenue officers become more skillful in the discharge of their duties. It is also probable the opinion held in the revenue office, by those having the best means of knowing, will be found correct, in which the amount collected for the year ending 30th June, 1866, it is thought will reach three hundred millions dollars.

At any rate, I should think it would be the duty of Congress, at the next session, to provide for raising enough, at all hazards, to satisfy all the world that we are both able and willing to pay. This ability of ours, I think the above figures put beyond a reasonable doubt, because we have now felt the burden of $305,000,000 for 1865, and we can readily guess from that the weight of 350 or 400,000,000 in 1866. If we have paid that sum this year, ($305,000,000,) when all was in confusion and disturbance with the closings scenes of the war, with the disbanding of nearly a million of men, and with all the uncertainty incident to our situation, we certainly have right to expect a very large increase when peace is fully restored, when the citizen soldiers get back to productive industry, and the policy of the nation is settled by the restoration of harmony and good will in all parts of the Union If we can once raise enough to pay off the interest and current expenses of the year, we will be free from danger, if we do not, it is impossible not to fear the worst results. Our people are willing to bear as long as possible the heaviest burdens if they find them growing lighter, but if on the other hand we make their condition hopeless by an increase of them, they may remedy themselves in a very abrupt and compendious manner, and refuse to pay altogether. To avoid a contingency so much to be dreaded as this, we must struggle to achieve several things: 1. The pacification of the south. 2. The restoration of the public credit. 3. Retrenchment of government expenses to the lowest point. 4. The discountenancing of all waste and extravagance, even in private life. 5. The establishment of a great system of American industry, various enough in its character to furnish employment to all our people every where, with sufficient protection to put it out of the reach of undue foreign competition and combination of capitalists against it, and till it has matured itself.

1. It must be evident to all who reflect, that we are deeply and vitally interested in the immediate pacification of the Southern States, and in their speedy return to conditions of prosperity, so that they may aid us in paying their share of the national taxes. How this can be done best is a most difficult question, and one upon which people will differ widely. The true rule, however, in such cases, is not only to acquiesce in, but to carry out cheerfully whatever plan the properly constituted authorities may adopt to attain the desired end. Somebody must decide in such a conflict of opinions, and those to whom we have confided that duty ought to have our confidence and support, although they may not do what we would have done had we been in their places. All government is based upon the agreement that those who are disappointed by the rejection of their plans, will submit themselves to that which is determined upon, and without this it could not exist. The very best way to do anything is seldom found or adopted; but owing to the imperfection of our natures, we must always fall upon one not free from objections. Nevertheless even the worst of these succeed in the hands of wise men who make the best of them, in the help they give one another in carrying them out. One thing I think very certain, that union, harmony and the supremacy of the laws cannot be restored by continuing the same sectional hate and animosity which so recently endangered them; while it is equally certain that a return to the old national and fraternal feeling would soon unite us more strongly than before.

2. And second, as to the national credit, or as I might with great propriety phrase it, "your credit." This, at present, is at forty-three or forty-four per cent. discount; that is, it takes $1 43 or $1 44 of your cents to make a dollar; and when you buy anything with your dollar, you only get seventy cents worth; your dollars are only worth seventy cents each.

Why is this? Because people are afraid you will not redeem your dollars, and they charge you thirty cents on each of them, on account of that fear and the risk they run. Now if you could satisfy them their fear was groundless, and the risk they ran was nothing, you would bring your credit and your money at once to the gold standard; you would increase the value of all your dollars nearly one-half; and you would keep up the supplies of your army and navy nearly one-half cheaper than you do now. It takes, too, nearly one-third more of your dollars to pay the interest on our debt than it would do if we kept them at par, because that must be paid in gold.

You ask, how is this to be done? I answer, let us show that we mean to pay it, by levying, annually, as much taxes as will keep it from increasing; while at the same time we cut off all expenses of the government which are not absolutely necessary. This will do it, and nothing else will. No kind of financiering, no kind of jugglery, will help us now; we must pay, and to pay easy our intention to do so must be manifested continually. Nothing keeps a creditor in a better humor than to show our good intentions toward him and his claims; and by putting your money up to par you will increase the national revenue nearly one-half, without raising the rates.

3. Every part of the government service should be thoroughly revised, every abuse should be corrected, and every expenditure cut off that is not absolutely necessary. Abolish as many offices as can be dispensed with, and discharge the incumbents; because at the heels of a war such as we have had, there will be thousands who will the more anxiously desire to cling to the place, since the place itself has become a sinecure. Do away with all bureaucracy, and confine the government within its legitimate sphere, leaving to the good sense of the people to attend to their own affairs in their own way, as they are interested to do their own business far better for themselves than any officers which may be chosen to do it for them.

4. It might be well to remember, too, while retrenchment and reform is going on in government affairs, that a reform is equally needed in this country in the mode of life too prevalent with individuals. It is a saying as old as history, that luxury is fatal to republics, and destructive of public virtue. Wherever it prevails with those rich enough to indulge it, it is sure to be imitated by thousands who are too poor to do so. These, then, become slavish and corrupt, in order to maintain themselves in extravagance. With such people there is no such fund to draw upon as the public money, and no place so loosely guarded as the public treasury. There they can plunder with impunity, because it does not require a great while to beget such a number of offenders that correction is impossible, and every new rogue who makes his appearance is hailed as an accession, and to be protected as one of the fraternity.

5. As agriculture in this country is now sufficiently productive for its markets, I would turn your attention to the establishment and protection of manufactures of all kinds of which it is capable, as being, for you, the surest way to create a market for your products; and besides, the one which most certainly leads to wealth and independence. You have seen that you are now in a situation to enter more largely into this department of industry than any other nation, because you have more coal to create force, more iron to make machinery, than any other. Besides these, you have more of cotton, in fact, than you can work up; a raw material of the greatest value, and one which would, in the end, contribute most materially

to put our finances upon an easy footing, if we could manufacture it ourselves, instead of letting other people do it for us and take the profits.

Great Britain is, perhaps, the richest empire in the world, and she owes it chiefly to her manufactures, which she carries on, by the aid of her coal and iron, in a manner not only worthy of all praise, but of all imitation. She burns, perhaps, forty millions of tons of coal annually, makes three millions of tons of crude iron, and worked up, in 1860, one billion two hundred million pounds of our cotton, and nearly two hundred millions of pounds she got from other countries. This cotton cost her about two hundred millions of dollars, and when manufactured, it was worth to her nearly twice as much, after deducting six or seven millions for drugs and dyestuffs, which she had imported to work into it. So that she had about one hundred and ninety millions for her time, trouble and labor in the premises. Why should not we strive to make the same gain, in the same way?

I am also encouraged in the belief that we might rival her, in a very short time, by a consideration of what we have already done, and under somewhat adverse circumstances. Heretofore we have suffered from a want of circulating capital, and we have had to pay about twice as much for the use of money as they do in England. This was a serious drawback, but it ought not to remain in our way much longer, since the national debt, mobile in itself, is still further mobilized in being made the basis of bank capital. Add to this the fact, that the present supplies of the precious metals are exercising a most extraordinary influence everywhere, in rendering exchanges easy. There is now hardly any species of property in this country which cannot be solved into money, readily and at fair prices, so that there is no such thing as dead, inert capital, and all the business operations of society take place easily.

While, too, advantages on the score of capital are being more and more equalized every day, in our favor, our prospects are brightening in another direction, that of labor, the wages of which, in European countries, has been so low, that it was impossible for us to compete with it, without degrading our own below the republican standard. Now, although our wages are not falling, yet I think there are evident symptoms that they are about to rise in other countries. How long can the capitalists of the old world continue to buy the labor of the poor for that which merely suffices to keep soul and body together? And how have they been able to do it heretofore? The answer is obvious. The poor could not escape from the thraldom imposed upon them by over-population, and the ascendancy which ages had conferred upon power and capital over them. They can escape now. The new fire force is annihilating space, and breaking down rapidly all the barriers which have so long hemmed in the laborers of populous countries. Populations are being mobilized, too, and move upon one another, from place to place, far more freely than ever before, and it seems to me the day is not far distant when the poor man will find out the highest and best market for his labor, with the same shrewdness the rich merchant finds it for his goods, even though it be in the antipodes. He goes to the other side of the globe with far more ease to-day, and in less time, than he used to require in crossing the Atlantic. Why should he toil a doomed slave in Europe, when fortune and competence await him in new homes in America, Australia, and other lands? Is he too poor to pay his passage, or too timid to make the venture? Capital is beginning to know his worth, and is providing for his transport, and his protection by the way. Continents are being opened up for his reception, and he is no longer compelled, as in old times, to colonize himself slowly away from the coast, through generations of struggle. The railway dashes away through the very heart of the wilderness, carrying him along where farms and mines are to be had, not solely as the reward of genius or money, but simply as the wages of a sound body, and an industrious pair of hands. The wages of labor, then, must soon find its level, the same as other commodities, and that upwards, and not downwards, as heretofore.

In the meantime, and before the changes I anticipate will be brought about, we must do the best we can; for if we can only once get a fair start in manufacturing, we will bring into play a vast amount of labor, even in this country, which is now unproductive. We have seen that the laborer does not move as readily from place to place, in search of higher wages, as he is likely to do after a while. He manifests, in many cases, the same indisposition to seek for employment at all, unless it comes to him, and is congenial. Idle men are not so much idle because they prefer to do nothing, as because they have not found the kind of work which suits them. Some are industrious in one pursuit, some in another, and all are as various in their preferences for a vocation, as they are in other things.

One of the advantages of a manufacturing community is, that on account of the variety of the processes it requires, it is able to furnish congenial employment to all the members of it, so that none are idle. It is for this reason that the people of New England are, on the whole, more industrious than in other parts of the Union. She has such a variety of industry, that all her people find something they like to do. In the South, on the contrary, there were more idlers than in the middle States, and the reason was, there was nothing doing hardly except farming and planting there; and those who did not like those pursuits did nothing. Establish manufactories, however, and they will be as industrious as anybody else. I have no doubt, either, that there is just enough of such idle people now in this country, who, if they had a chance, would produce as much as we uselessly import. I think it will be found to be a law of nations, as it is of families, that just in proportion as they go abroad to purchase that which they might produce themselves, just in the same proportion will a certain number of them remain idle in consequence. Hence it is one of the first and fundamental duties, both of families and nations, if they want to be independent, never to go elsewhere to buy what they could make at home. From this any one can have an idea of the importance, to us, such a source of revenue would be, if we had all our idle people everywhere employed.

Mr. Morrill, of the Cambria iron works, in a letter of his recently published, shows that it requires about forty days' labor to make a ton of iron, and that in this period of time, the internal revenue tax upon the articles consumed by the laborer, is $5 83, or $43 72 for the year. This sum the laborer pays, because he is at work, and can afford to consume the articles subject to the tax. If, however, you stop the Cambria iron works, by buying your iron abroad, you will throw the laborer out of employment, and oblige him to consume only such articles as are absolutely necessary, and therefore free, and he will pay nothing towards the national burdens. Again, however, it will be remembered that if we keep him employed, the product of his industry also pays a tax, which, if he were not employed, would not go to swell the collections in the revenue office.

I suppose it is hardly necessary to elaborate this point. There is something in the view I have taken of it, which every man seems to recognize as true, almost by instinct.

The question of free trade and protection has been much mooted in this country heretofore. Now, however, we are likely to hear less of it, from the fact that no one would be willing to raise the price of a home product by internal taxation, and then admit the foreign product duty free. To do so would inevitably destroy us. This, then, settles the difficulty, because if the impost is laid at all on that principle, it must be adequate to put the home producer on an equal footing with the foreigner, or it might as well not be laid at all. And it is to be hoped that, hereafter, the policy of the government will be fixed and steady, so that men may know, when they embark in any business, how much they can expect in this way from it, and how far they can rely on it. Nothing exerts such an injurious effect upon the production of any country, as a constant tinkering at the laws, and especially revenue laws. No man is willing to embark his capital in a pursuit, if he is afraid that Congress will either put new taxes on him, increasing the cost of his commodities, or will take them off somebody else, and thus lower the cost of them, ruining him, perhaps, in an hour. No citizen ought to be exposed to changes of this kind, because it is impossible to guard against their bad effects, depending, as they do, upon the caprices of the Legislature, and the various fortune of parties. No nation ever yet has been able to build up a great system of industry, without steady protection of this kind. Without this, it never could get a start in competition with rivals in successful operation. Constructive industry has its periods of childhood and infancy, when it requires the fostering care of the community, in order to keep it on foot till it matures itself in all the arts it must necessarily learn. It must make its erections, it must procure engines and machinery, must lay in stock and raw material. It must next learn the various processes involved, must learn the economy of managing the business, and finally, must be able to keep pace with the improvements daily making in all parts of these. So that it will be seen that it is not the work of a day, or a year, but indeed heretofore it has required centuries to enable it to command in every market. Now, however, everything perfects itself so rapidly, that a much shorter time will be required.

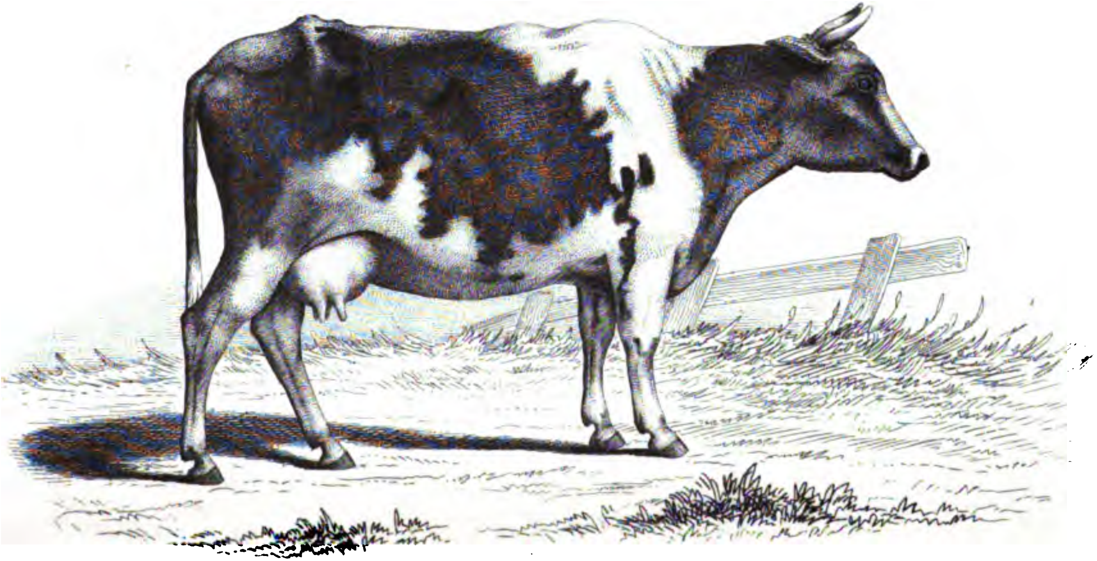
Still, during that time it is essential that it, at least, should have the control of its home market. This is the lowest price any community can pay for this species of independence, and the great advantages which ultimately flow from it. And this the community cannot confer, except through the intervention of its government. It cannot be done by the agreement or combination of individuals, which has been often tried, and as often failed.

I think, then, we should extend to our industry, during this period of its pupilage, a steady and uniform degree of protection, sufficient, at all times, to secure it against the combination of all rivals, which is another and very formidable danger to which it is exposed, because any one can see that the manufacturers, rich as those of England, could well afford to stand a heavy tax, in order to break down such a rival as we are likely to be, if we are once matured. And the very fact that they may combine for this purpose, (and it is said have, at times, done so,) is enough to justify us in guarding in every way possible against them. It seems to me we can better afford to pay to keep them from mischief of this kind, than they can afford to pay for doing it.

I am, therefore, very strongly of opinion, that hereafter there will be little difference of opinion in our councils as to the policy of inaugurating a great system of American industry, worthy of the age in which we live, and showing a proper appreciation of the remarkable advantages we enjoy for the purpose of carrying it out.

Then, again, we shall be knit together in the bonds of true union and harmony. There will be no more sectional division, but all will constitute a whole, of which the parts will be so dependent upon one another, as to exclude the possibility of rupture.

This is now within our reach, and no people ever before had an opportunity of achieving so much, if they are wise and prudent, and none have ever had so much in danger from folly and dissension. Empire is offered to us on the one hand, if we show ourselves worthy; anarchy and disgrace on the other, if we do not. Choose ye between them.



BERTHA.

Owned by Amos E. Kapp. Northumberland. Pa.

THE ECONOMY OF INTELLIGENCE.

AN ADDRESS BEFORE THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY, AT THE ANNUAL EXHIBITION, WILLIAMSPORT, SEPTEMBER 27, 1865, BY WM. H. ALLEN, PRESIDENT OF THE AGRICULTURAL COLLEGE OF PENNSYLVANIA.

MR. PRESIDENT AND GENTLEMEN OF THE SOCIETY:—When valuable minerals are discovered in any accessible locality, men of practical sense are quick to understand that the opening and working of the mines will benefit themselves and the public. They know that mountains of iron, and placers of gold, and rivers of oil can add nothing to the wealth of a country until they are reached, appropriated and used. Therefore they subscribe liberally to works of internal improvement, by which the treasures which are locked up in mountain, rock and forest, may be set free and made available. And they act wisely. The increase in the value of property in Pennsylvania, resulting from her public improvements, would pay their cost five times over, and every citizen of the Commonwealth has been benefited, directly or indirectly, by these works.

But Pennsylvania has other veins of latent wealth—other quarries of rich ore—lying waste and unopened, which are as capable of adding to her prosperity as her abounding forests, her fertile valleys, and her rich deposits of iron, coal and oil. These are the minds of her children—minds hidden, inert, unproductive, and unvailable for the higher uses of God and man. If these were cultivated and set at work, "what an accession of prosperity, power and true glory would be the result! Its effects would soon be manifested in more abundant production, in a higher civilization, in wiser laws better administered, and in greater security for life and property."*

Labor and capital being mutually dependent, neither can be profitably employed without the other. The same is true of intelligence and industry; and an exposition of the relations of these deserves a larger space than has been given to it in the books of systematic writers on political economy. If educated labor can produce the value of five dollars a day, while unskilled labor can produce but the value of one dollar, the educated laborer, if we regard him merely as a wealth-producing machine, is worth to the community five times as much as the other. This estimate leaves out of the account the higher and nobler uses of the man as a member of society, as a teacher, discoverer and inventor. We cannot count in dollars the value of a man who is competent to break loose from routine and find a shorter and easier way to results; who can devise new processes and new implements to execute them; who makes two blades of grass grow where but one grew before; who reaps ten acres of wheat as a pastime, while his neighbor, with swollen wrist, and aching back, and much sweat of hard labor, reaps one; who introduces new arts, opens new avenues to wealth, discovers a value in materials which ignorance had cast among rubbish; and what is still better, directs uninstructed labor into more productive channels, and thus contributes a hundred fold to the common prosperity. The value of such a man cannot be estimated by numerical computation.

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* Quoted *memoriter* from a speech by Rufus Choate.

We should be at a loss to assign a limit to the number of millions which the spinning jenny added to the wealth of England, or the cotton gin to that of the United States. The invention of Richard Arkwright enabled England to spin the destinies of the world; while that of Eli Whitney made it possible for our country to supply the raw material to keep the spinster at work. The steam engine, with its manifold applications to navigation, locomotion, manufactures and war, has proved that the power which moves the world does not reside in the lever for which Archimedes was puzzled to find a fulcrum, but in rarified vapor.

These labor-saving, wealth-producing machines were not made by labor alone. The printing press, the power loom, the magnetic telegraph, the mower and reaper, the sewing machine, and a hundred other mechanical contrivances, all suggest something in their construction antecedent to hand-work. The ship which spreads her wings to the breeze, and tends steadily towards her port, from whatever point the winds may blow or the current run, is not an accidental aggregation of wood and iron, sails and cordage. As the ideal form is in the mind of the artist before it comes forth from marble, or stands out upon canvas, so all the achievements of human skill first existed in the intellect, and assumed form under the workman's hand in obedience to the imperial mandate of mind, and in conformity with the plan which his own, or some other master head, had devised.

A builder does not rear his structure till he has considered the form that will be appropriate to the intended use. A book, worthy of the name, is not made with the manual labor of writing it out. Astronomy has not advanced to its present state by mere star-gazing. If Le Verrier had not determined the place of the planet Neptune by ingenious cyphering and more ingenious reasoning, Galle's telescope might have swept as successfully for the lost Pleiad as for it. Chemistry has not extended its researches to every substance in air, earth and water, by making experiments at haphazard. Nature does not reveal her choicest secrets, except to him who knows how to question and cross-question her, and how to interpret her answers. The falling of an apple had been a common occurrence from Eve to Newton, but men had been content, like our first mother, to test the flavor of the fruit, without caring to inquire how it came to fall. It was reserved for Newton to propound that question, and not only to explain the fact, but also to connect that fact with a multitude of other facts, by a chain of universal law.

But with these achievements of intellect all around us, we permit nine-tenths of the mental capital of the country to lie dormant and unproductive for want of culture. If all the minds which are capable of high improvement in any community were trained for use by education and discipline, they would be adequate to all the demands of private enterprise, and to all the exigencies of the public service. As things are, the supply of educated labor is not equal to the demand for it. Large capacities lie buried, while educated mediocrity pushes its way into high places, and the public is worse served at greater cost.

There are some who profess a serious apprehension that these views, if carried out practically, would turn the heads of many useful people and make them worthless. I care not how far you turn their heads, so that you turn them in the right direction, that is, *upward*. This objection is made by the hard school of economists, who estimate the value of a man as that of a horse in a mill, by the number of times he can turn the sweep before he wants provender, and by his perfect indifference as to how, what, or why he is grinding. They believe that one man is born with a saddle on his back and a bit in his mouth, while another comes into the world ready booted and spurred for a ride. It is preposterous that any one living in the light of the present age, under a government of equal rights and equal men, should object to that culture which elevates the common mind and raises society to a higher level. Will the workman perform his task less cheerfully, or less skillfully, because he knows that he is somewhat more and better than an appendage of plow, loom or anvil? Will the engineer run his locomotive with less care and caution, because he happens to comprehend the principles of its mechanism, and is conscious that he is something more than part and parcel of the machine? Will the seaman hold the ship's helm with a less steady eye and sturdy arm, because he can converse with the winds, and read the language of the stars? I hold that the humblest fisherman would decoy his finny prey more adroitly, if mind-culture should make him something more than a simpleton at one end of a line trying to inveigle another simpleton at the other end.

Let us next observe that this waste of mind through want of practical culture, is accompanied by a corresponding waste of labor through misdirected effort.

Without denying man's adaptability to the circumstances in which he may be placed, it will be conceded that almost every one has more natural aptitude for one occupation than for another, and that he will be more useful and happy in one line of duty or business than in another. In this, as in all other arrangements of the Divine economy, we perceive proofs of beneficent wisdom, for care has been taken that all the wants of civilization shall be supplied; and to compass this end, the inclinations, tastes and capacities of different individuals have been made to vary in such a manner as to minister to the well-being of all. Universal geniuses are rare. The swan, so graceful in the water, is a clumsy runner; and the eagle, so majestic as monarch of the clouds, swims very awkwardly; and when a man turns up who has a knack at doing everything, he will usually be found on trial to do nothing well.

But through preconceived notions of respectability, men waste their labor in attempts to do what neither nature nor education has fitted them for. Dread of losing caste has made many a briefless lawyer, and spoiled many a good farmer and mechanic. It is a mistake to predicate of the occupation that respectability which belongs only to the man. But many, instead of forming a character that shall reflect dignity on their calling, rely on their calling for their character; and having placed themselves in this false position, they waste one-half of their lives in learning that they have not the wit to make a living, and then waste the other half in scheming to "live by their wits."

We honor labor, not because it is labor, but because it is useful and productive. There is not a dollar of property which its strong, hard hand, assisted by the elements and forces of nature, has not created. But how? Not alone by the wear and tear of living sinews. The man who should manufacture pins with file and hammer, however diligently he might work, would as certainly starve, as he who should undertake to convey passengers on a hand-cart along the line of a railway. Labor, unless intelligence direct it, has neither honor nor reward. As we honor useful labor because we see and comprehend its products, so and for a similar reason, we honor useful thought. But both prosper by reciprocal aid. Labor without thought is unproductive; and thought without labor only consumes.

Some do nothing but think. They will not stoop from their abstractions to say, write, or do any one practical thing for their fellow-men. We do not honor these intellectual dreamers, for we see no fruit of their mental incubations. They may have much learning, but all you can get out of them is worth about as much as Dominie Sampson's "*pro-di-gi-ous.*" They may have ideas as huge as those of Irving's Wouter Van Twiller; ideas so big that they can examine only one side of them at a time; but when they come around to a new side, the distance is so great that they have forgotten how the first side looked. They doubtless move in deep water, for they never touch bottom, and never come ashore. While they speculate profoundly on the state of society in the moon, they forget that living men are much more interested with speculations in real estate on the earth. They have counted the trees of pine-capped Ida, and the golden sands of Pactolus, but talk to them of the lumber of the West Branch of the Susquehanna, and the black diamonds of the Wyoming valley, and they will tell you that they have not studied modern Greek. They have measured the height of the Acropolis, and all the dimensions of the Parthenon, but ask them the latitude of the Great Salt Lake, and you will find that their knowledge has gone up Salt river. They have heard that the owl was taken by the ancients as an emblem of wisdom, and by imitating his solemnity of face, they expect to be deemed as wise as their nocturnal prototype.

Others do nothing but keep busy. They work much and do little, because they either work without any plan or purpose, or with a plan and purpose that lead to no useful end. A man may walk a thousand miles in as many successive hours, or wheel a barrel of apples from Newburyport to Boston, or perspire over any other muscular absurdity; but what good comes of it? Who is fed, clothed, sheltered, educated, or made better? It is said that an Athenian boasted to a Spartan that he could stand on one leg longer than any man in Sparta. The Spartan replied, "but a goose longer than you." He who devotes years to the construction of microscopic mechanism, until he puts all the machinery of a watch into the size of a gold dollar, may make a toy which will amuse children, both large and small; but when he has finished it, he will not have contributed to the welfare of society the value of the coin which measures the magnitude, or rather the *minitude*, of his work. The old poets imagined that one of the punishments of the wicked in the other world was to draw water in a seive; but all the water escaped before the seive came up. Another was sentenced to roll a great stone up a hill; but just as the stone reached the summit, down it would tumble again. It would be better for the stupid, blundering worker of this world to draw water in a seive, or roll the stone of Sisyphus, than to toil with might and main to do everything wrong; for then he would only lose his labor without mischief to others. A late medical lecturer used to say to his classes, that by a certain mode of treatment which prevailed at that time in the Southern States, an enterprising physician could ruin constitutions enough in two or three years, to insure himself full practice through the remainder of his life in trying to patch them up again. So the man who works at any craft whatever, without the guidance of a modicum of brain, is always sure of having something to do; but like a verdant domestic, he kindles the fire on the stove, instead of in it, and smokes his eyes out instead of cooking the breakfast.

There are several institutions of learning in Pennsylvania, which were founded and organized with a direct aim to diminish, by a more practical union of head-work with hand-work, the waste of mind and labor to which

I have invited your attention. Two of these, with unlike organization and methods, are similar in principle and aim. Both are designed *to elevate labor.* The oldest of these was planned and endowed by a successful merchant, who furnished in his own person a rare example of that economy of mental force by which a man may extend his enterprises over the whole world, and by operating through the heads and hands of subordinate agents, may become in a manner ubiquitous.

Stephen Girard was a worker; a dilligent, provident, intelligent worker in wood and stone, in bricks and mortar, in ships and merchandise, in lands and cattle, in stores and wharves, in gold and silver, in bank notes and bills of exchange, and he knew the qualities, values and powers of them all. But chiefly he used men as instruments to execute his work, and the insight to select these implied rare discrimination, while the ability to direct them required the exercise of sound judgment and extensive knowledge. He measured the value of men by their intelligence, their honesty, their industry, their fidelity to his interests, their obedience to his instructions, and by their skill as carpenters, masons, ship-builders, seamen, farmers, bankers, clerks, supercargoes and masters of vessels. He also knew how to test their honesty and capability, and seldom made a mistake in either. To be foreman in a manufacturing establishment, or to cultivate and garner the harvest of a farm, does not require more than ordinary reach of thought; but the civilized world was his workshop, and the surface of the terraqueous globe his harvest field. His enterprises extended over years of time, and over seas, islands and continents, from the equator to the polar circles; but he had them all spread out like a map before his mental vision, and he so combined his operations, that the supply was sure to arrive at the place of demand in the requisite quantity and at the right time. To accomplish this, what sources of intelligence he must have had access to and used! What knowledge of the productions, tastes and wants of the people of different countries! What skill in the use of credit without abusing it! What sagacity in forming his plans! What energy, secrecy and boldness in executing them!

And for what was this vast expenditure of thought and labor? When we contemplate this architect of a fortune toiling early and late, without repose or relaxation, to extreme age, with little sympathy from his fellow men, working for an object which had been the cherished purpose of his life—the endowment of an institution in which the unfortunate and destitute might be trained and prepared for the intelligent use of their minds and bodies—he rises on our view to a higher level than that on which the slave of avarice stands, and takes rank with those benefactors of mankind who have lived a self-sacrificing, heroic life.

The design of the college which bears and perpetuates his name, was not so much to maintain in comfort a certain number of orphans, not so much to provide a school for their instruction, as to attain an object above and beyond these, to which these were preliminary and preparatory, that is, to elevate and enoble labor by the diffusion of intelligence among a class of youth, whose success in life must be won, if won at all, by their own industry. A beneficent scheme, worthy of the man and of his splendid fortune!

The Agricultural College of Pennsylvania, the second in the order of time of the institutions above alluded to, was established to give instruction, at moderate cost, to the sons of that great industrial class which is composed of farmers, manufacturers and mechanics—a class which comprises a large majority of the people of the Commonwealth, and whose industry is the basis of its wealth and prosperity.

This institution was founded by enlightened and public spirited citizens, under the auspices of the State and County Agricultural Societies, aided by liberal donations from the Commonwealth and from individuals. Its object is to elevate labor, by disseminating among the industrial classes a knowledge of the arts and sciences by which labor is made productive, together with such moral and social instruction as will prepare young men to discharge with credit the duties of good citizens of a free, self-governing Republic. It aims to develop and discipline the physical, intellectual and moral powers of its students in harmonious proportion.

At this college it is honorable to work, and the sons of the rich labor equally with those of moderate means. Every student, by giving six hours in twenty-four to study, three to recitations and lectures, three to work, four to meals and recreation, and eight to repose, will develop mind, muscle and manhood, and at the end of his course will be prepared to gain an honest and honorable livelihood, and to assume the responsibilities which society will impose. He will leave the college with the most valuable of acquisitions—*a sound mind in a sound body;* and if any of our friends here present will visit the college, and examine its human product, they will not fail to notice the full round limbs, the ruddy complexions, kindly digestion, and elastic step of the students, and to contrast these with the flabby muscles, pale faces, dyspeptic stomachs, and languid gate of many young men who have tasked their minds at the expense of their bodies.

I regret that we cannot yet exhibit similar qualities in the best breeds of horses and cattle; but our first care has been to grow a harvest of men. Fine animals and great crops will come in their turn.

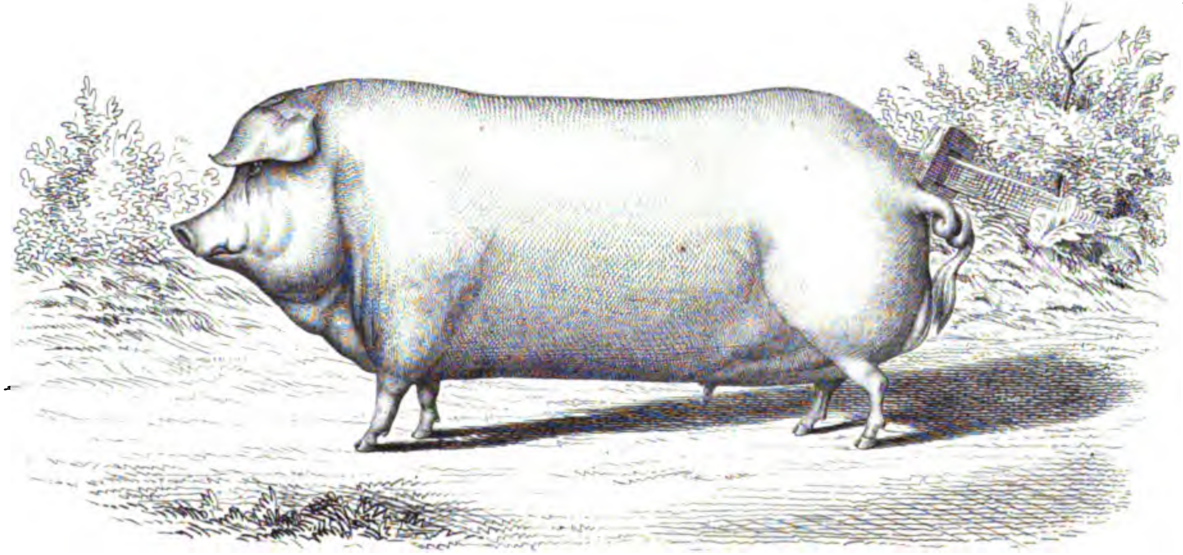
Our course of study includes the arts and sciences which are pursued in the best American colleges, except the ancient languages. The omission of the classical course enables our students to devote more time to chemistry, botany, mineralogy, mathematics, mechanics, and other sciences of practical utility to the industrial classes. But while Greek and Latin do not form a part of the regular course of study, instruction is given in those languages to students who have time and inclination to pursue them.

It has been the aim of the trustees and faculty to discard a rigid and invariable routine of study, for that, like the fabled bed of Procrustes, would require the stretching of some minds beyond the endurance of nature, and the curtailment of the fair proportions of others. They have preferred an elastic and flexible course, which may be expanded or contracted to suit the varying capabilities and aptitudes of the students.

Our experience has demonstrated that students who work three hours a day, will make as much progress in study, in the long run, as those who do not work at all. While, therefore, their labor causes them no mental loss, it is productive of the physical gain of better health and more robust constitutions. At the same time they are acquiring a practical knowledge of the rearing and feeding of stock, the use of agricultural machines and implements, the preparation and application of composts and other fertilizers, the planting, budding, grafting and trimming of fruit trees, the culture of table vegetables and small fruits, the construction of fences, the planting and trimming of hedges, the culture of shrubbery and flowers, in connection with the scientific and economical principles which are applicable to these varieties of work and production.

It is not to be expected that the labor of the students will be a source of revenue to the college. They work for instruction, for health, and when they feel an interest in the results of their labor, for recreation. They work for a practical application, in the field, of those principles of science which they are taught in the class rooms; and as they are all learners, their work will hardly be performed with the celerity, skill and finish of adepts. An experienced plowman would detect many imperfections in the furrows they turn; and when they cultivate the corn, they sometimes tear up more than the weeds. They are beginners, and like all such, they give the supervisors of their work large scope for the exercise of patience. Yet they succeed in making very fair crops, and we hope in time to have something worth exhibiting to your society.

Our number of students this year has been one hundred and thirty-two, one-fourth of whom are from other States. We have representatives from Massachusetts, New York, New Jersey, Delaware, Maryland, Ohio, Indiana, Iowa, Wisconsin, Arkansas, Louisiana, District of Columbia and the Island of Cuba. We desire more representatives from Pennsylvania. We have ample accommodations for three times our present number. The industrial classes, for whose benefit the college has been founded, and who govern and direct its operations, through the agency of the State and County Agricultural Societies, number more than two millions of the



CHESTER JIM,

Bred and Owned by E. B. Ashbridge, Breeder Willistown Inn, Chester Co. Pa. Winner 1st Prize, Pennsylvania State Fair Harrisburg 1868,
Maryland State Fair Baltimore 1869 Virginia State Fair Richmond 1869 Penna State Fair, Scranton 1870,
Virginia Valley Fair Winchester 1870 Virginia State Fair Richmond 1870.

inhabitants of the State; and yet the number of Pennsylvania students is less than one to twenty thousand of its people. Send us, next year, one for every ten thousand people, and the capital which has been invested in roof and rooms for their shelter and comfort, will lie idle no longer. Enable us to send forth a hundred educated, industrious young men every year, and the benefits of the college will soon be diffused through every county of the State; a new impulse will be given to agriculture; brains and sinews will unite their forces to augment the productions of our fields; and the application of science to industry will succeed to a blind and profitless empiricism, as well as to a stubborn hereditary routine. The economy of intelligence, through the agency of thoughtful and practical men, will prevent the waste of material which is the natural result of mind-waste, and by the saving of fertilizers, labor, food and all forms of capital, will add millions every year to the pockets of the farmers and the wealth of the State.

EXHIBITION OF 1865.

DESCRIPTION OF THE EXHIBITION OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY, HELD AT EASTON, BY JOHN F. WOLFINGER, MILTON, NORTHUMBERLAND COUNTY.

The Pennsylvania State Fair for 1866 was held at Easton, in Northampton county, Pennsylvania, upon the grounds of "*The Farmers' and Mechanics' Institute of Northampton county, Pennsylvania,*" consisting of 30 acres of land, beautifully situated about a mile and a-half from the centre of Easton. The buildings on this ground consist of a neat frame dwelling house for the use of the tenant, who takes care of the ground—a commodious and very ornamental two story frame building or *Agricultural Hall*, 60 feet wide and 150 feet long, capped with a large and beautiful dome, surrounded with a strong and handsome foot walk and railing, and also numerous well constructed and roofed sheds and stalls for the accommodation and display of agricultural implements and machinery and live stock, as well as a large and convenient wooden shed for selling tickets for admission to the fair. The Agricultural Hall occupies an elevated and central position, and thus overlooks all of the fair grounds and the entire surrounding country, both of Pennsylvania and New Jersey. It cost the society about $10,000, and the ground itself cost it $200 per acre, when the prices of land and building materials and labor were much cheaper than they now are.

The State Agricultural Society also had erected upon the ground a new and very large and splendid oval shaped white *canvas tent*, like that used by our largest circus shows, being 80 feet wide and 115 feet long, and correspondingly high at its centre or pole. This canvas structure was called "*The Floral and Fruit tent*," from its containing all of the flowers and fruits exhibited at our fair, besides many other products of the field and the garden.

FIRST DAY OF FAIR—TUESDAY, SEPTEMBER 25, 1866.

The fair was opened at 10 o'clock A. M., to-day. And the day was mainly spent in bringing upon the ground the various articles intended for exhibition and arranging them in proper order for show, examination and decision by the judges or different committees of the fair. And while this was being done the judges of the different departments, as they appeared upon the ground, had their names registered in the judge's book at the office or white canvas tent of A. B. Hamilton, the President of our State Agricultural Society, at the large flag-staff or pole in front of the Agricultural Hall, in order to ascertain who were present and who were absent, so that the vacancies in the different committees might be promptly filled by suitable persons selected upon the grounds to act as judges.

From 1 to 4 o'clock P. M., to race course, which was about half a mile long, was thrown open to general driving and contests of speed, subject to the orders of Alexander Russell, Adjutant General of Pennsylvania, who acted as Chief Marshal of the fair. And the privilege of using the race ground for these purposes was freely and richly enjoyed by sportsmen who delight in the movements of that noble and graceful animal, the horse.

SECOND DAY OF FAIR—WEDNESDAY, SEPTEMBER 26.

As it commenced raining early in the morning and rained heavily all day, all of the exercises and proceedings previously ordered to take place upon the race course to-day were of necessity postponed. The judges of the fair, however, met at the President's office, and after receiving their premium list books and the badges of their official position, worn on their left breasts, proceeded to view and examine the various articles exhibited in their respective departments, by way of preparation for the decisions which they would soon have to make between those who were contending for the premiums offered by the society. But few persons were upon the fair grounds to-day, excepting the officers, judges and police of the society, and some few owners of exhibited articles and those who were prepared or preparing to furnish refreshments there. And taken as a whole, the day was very discouraging to us all, and quite a damper to our long cherished hopes of fair weather and success in the holding of our fourteenth annual agricultural exhibition.

THIRD DAY OF FAIR—THURSDAY, SEPTEMBER 27.

During Wednesday night the rain clouds passed away, and on Thursday morning the sun shone down upon our old mother earth with unusual splendor and a heat that soon dried off our sloping fair grounds, and made them far more pleasant than any of us had expected. And as a natural consequence, the tide of human life that now set in to our attractive fair grounds, from early morning to mid-day, and even after it, was wonderful and very encouraging, compared with yesterday. For the number of visitors upon our grounds were variously estimated as ranging from 20 to 30,000—say 25,000, and all seemed lively, cheerful and happy.

The judges now proceeded to the discharge of their duties in good earnest, and before sundown, most of their reports were completed and handed in to A. B. Longaker, the Recording Secretary of the society. The weather of Thursday was so delightfully clear and fine, that it enabled all persons to take a satisfactory view of every department of our fair. And the sounds of music all day long and from every side, fell so sweetly and so soothingly upon the ear, that all—old, young and middle-aged, were alike charmed and delighted.

EVENING—MEETING OF EXECUTIVE COMMITTEE.

In the evening a stated meeting of the society's Executive Committee was held at the Secretary's office, in Easton, to attend to and regulate such business of the fair's transactions, as required attention or revision and correction. And here various nice and important questions of a scientific, as well as practical nature arose and were well debated, considered and decided by those members of the Executive Committee who were present. This committee constitutes the very bone and sinew of the society, figuratively speaking, and no men of ordinary mind or practical ability should ever be put upon it, since first-rate mind and first-rate administrative ability are here, as elsewhere, essential to continued success and prosperity. For no good, but on the contrary, very great harm must ever result from placing men of inferior mind and morals, and inferior practical ability upon this committee. May the mantle of the aged and venerable men who are now at its head, fall upon the shoulders of those and those only who are fit to be their successors. And then continuous and increasing benefits will flow from our society to our citizens in every condition of life, and its grand object will thus be fully accomplished.

FOURTH AND LAST DAY OF FAIR—FRIDAY, SEPTEMBER 28.

The delightful weather of yesterday still prevailed; and the judges, so far as necessary, now proceeded to revise, correct and close their various reports according to the instructions given them by the Executive Committee last night. While this was being done, from 12,000 to 15,000 people again appeared upon the fair grounds, to see the exhibition and its race course and other attractive sights, which were as follows: From 9 to 10 o'clock in the morning the parade of the firemen of Easton and the grand cavalcade of all the horses on exhibition, took place upon the race-ground; from 10 to 11 o'clock A. M., Gen. John F. Hartranft's Kentucky thoroughbred and trotting horses appeared upon the track and were offered for sale; at 12 o'clock M., the *annual address* on agriculture, was delivered in front of the amplitheatre, (a high range of roofed seats, capable of holding an audience of 3,000 persons,) by the Hon. A. K. M'Clure, of Chambersburg, Pa. His address dwelt mainly upon the fertilizing elements of the air, and their effects upon our soil and crops, and our various imperfections in farming and the like—points that I need not detail here, as his address will very likely be published and speak for itself. At 2 o'clock P. M., a grand trot between the celebrated mare trotters the "*Mountain Maid*" and "*Fanny Allen*," for the premium of $300, took place upon the race-ground, the "*Mountain Maid*" winning the prize. And immediately after this and other trottings, L. O. Colvin's American Cow Milker or Milking Machine, (composed of four India rubber tubes to cover the cows teats, and having two handles for working the same,) was publicly used in milking a cow in front of the amphitheatre, and in the presence of hundreds of people, who were surprised to see how easily, quickly and nicely a cow can be milked with this machine. At 4 o'clock P. M., the race-course was again thrown open to general horse-racing and driving.

And as the owners of the various articles at our fair were now permitted by a general order, to remove their goods, fruits, live stock, &c., from the grounds, the Pennsylvania State Fair for 1866 now came to a peaceful and successful close, on Friday evening, the 28th of September. For the writer of this sketch is not aware of anything having occurred among the many thousands of people assembled there, to interrupt or mar in any way the proceedings of this now well established annual agricultural gala-time or custom of our State.

PARTICULAR VIEW OF OUR FAIR.

And now having given you this brief general view of our late State fair's proceedings, allow me to present a more particular account of our fair's best things, those that ought to be more generally known to, and possessed and enjoyed by the people of our State than they now are. It may be proper to observe here, that the premiums offered by the society were unusually liberal, and arranged under forty-four different heads, with competent judges to determine the comparative merits of the articles exhibited in each department. But as this sketch cannot be expanded into a large volume to notice everything, it must necessarily be confined to those things only that are the most useful and the most deserving of general culture or attention.

1. FRUIT DEPARTMENT.

The display of apples, peaches, pears, grapes and quinces was large and very fine, as exhibited by J. A. Nelson, of Mercer county; D. B. Lorah, of Berks county; F. Seitz, of Northampton county, and H. W. Long, of Hughesville, of the State of New Jersey, and others. The following is a descriptive list of the best autumn and winter apples exhibited:

AUTUMN APPLES.

1. Codlin—A native of England; very large, oblong, greenish or pale yellow color and sour taste; lasts from August to October, and very fine for sauce and pies.

2. Flake's Fall—A new apple of Mercer county, Pa.; very large, flattish and deep red striped; very fine for sauce and pies.

*3. Gravenstein—A native of Germany; large, round and beautiful bright red apple, of a very rich aromatic flavor.

*4. Hubbardston Nonsuch—A native of Massachusetts; large, smooth and very beautiful red or reddish apple; a winter apple in our northern States, but a fall apple here and farther south.

A 5. King of Tompkins county—A native of New York; large, variable in form, with reddish or crimson stripes on a yellow ground, rather coarse-fleshed, but of fine quality; a winter apple in our northern States, but a fall one here.

6. Lowell—Large, oblong, pale yellow apple, with an oily-like skin, and a very good, juicy and rich flavor.

*7. Maiden's Blush—A native of New Jersey; large, smooth and beautiful, with a richly colored maiden's face blush; rather sour, but good for sauce, pies and tarts.

*8. Mother Apple—A native of Massachusetts; large, bright red, with a fine sub-acid flavor.

9. Ohio Nonpariel—A new apple, of Ohio origin, very closely resembling our Pennsylvania Smokehouse apple in size, shape and color, but more richly colored, very handsome and of a rich, sweet, spicy and aromatic flavor.

*10. Porter—A native of Massachusetts; large, conical, pale yellow, with a juicy, sub-acid flavor.

*11. Rambo—A native of Pennsylvania; medium sized, streaked and mottled red and yellow; very rich, spicy and sweet and sub-acid flavor.

A 12. Smokehouse—Also a native of Pennsylvania; large, smooth, flattish and beautiful reddish yellow apple, with small white dots and a very rich, spicy sub-acid flavor; very fine for eating, sauce and pies; makes good sauce while it is yet small and green.

Nos. 2, 6 and 9 were exhibited by J. A. Nelson, of Western Pennsylvania. The rest are well known.

WINTER APPLES.

*1. Baldwin—A native of Massachusetts; large, round, bright red and of a rich, juicy, sub-acid flavor.

2. Domine—A native of England; large reddish yellow striped, resembling our Rambo and a fine winter apple.

B. 3. Esopus Spitzenberg—A native of New York; large, oblong, very solid; smooth bright red with gray dots; juicy and very fine, rich flavor, but too sour for some tastes.

A. 4. Fornwalder—A native of Pennsylvania; very large; greenish, with a dull red face and large gray dots; very variable in shape, but of a mild and very pleasant sub-acid flavor. It is often but erroneously called Pound-apple, Fallowater, Faldenwater, and since it originated with a farmer by the name of Fornwalder, in Tulpehocken township, Berks county, Pa.

5. M'Coy Pippin—Also a native of Pennsylvania; large, greenish or whitish yellow, resembling the Rhode Island Greening, and very good for sauce and pies. Exhibited by J. A. Nelson.

B. 6. Northern Spy—A native of New York; large, roundish, bright red and very beautiful, with a very rich, aromatic, sub-acid flavor.

7. Priestly Apple—A native of Pennsylvania; large, smooth, oblong, greenish and dull red, solid apple, with a pleasant, aromatic flavor; fine for eating and cooking. It originated with Jos. Priestley, the great philosopher, at the town of Northumberland.

*8. Rhode Island Greening—A native of Rhode Island; large, flattish, greenish yellow, with dark clouds or blotches; too sour for eating but fine for sauce and pies.

9. Rome Beauty—A native of Ohio, having originated with H. N. Gillett, of Lawrence county, in that State. It is a large, roundish, bright red and yellow striped apple; beautiful, rather coarse grained, but juicy and of good quality and superior for marketing.

*10. Roxbury Russet—A native of Massachusetts; medium sized, brownish yellow, rusty color; a very long keeping winter apple, its chief recommendation.

*11. Swaar—A native of New York; medium size to large; pale or rich golden, yellow color, with small brownish or red dots and russet colorings on the sun side; smooth, very small cored, solid and heavy, (*Swaar* being a Dutch word, signifying *heavy*,) with a very rich, juicy, spicy and aromatic sub-acid flavor; very superior for eating, sauce and pies; makes good sauce before it is half ripe, and keeps all winter; no better apple in the world.

*12. Wagner—Also a native of New York; medium sized and deep red color, with a fine, rich, sub-acid flavor.

*13. Wine Apple—A native of Delaware; large, smooth and beautiful red color, with a rich, vinous, sub-acid flavor.

B. 14. Yellow Bellflower—A native of New Jersey; large, oblong or conical, bright yellow with a faint blush towards the sun, and when fully ripe a splendid apple, with a fine, rich, juicy and sub-acid flavor; very good for eating, sauce and pies.

All of the foregoing apples marked with a * have been recommended by "*The American Pomological Society*" as being the best, and also the best adapted of all our apples for general cultivation throughout our northern, middle and western States, while those marked A, have been recommended by the same society as *promising well* for general culture, and those again marked B, as doing very well in particular localities and soils.

PEACHES.

Mr. Frederick Seitz, of Easton, Pa., had the largest and handsomest display of peaches on the ground. He exhibited ten living peach trees from four to five feet high, standing in earthen pots and bearing upon their limbs large and splendid specimens of this delicious fruit. As his trees bore no labels, I am unable to give the names of his beautiful red and yellow peaches, but they were evidently some of our largest, handsomest and best *late* ripening varieties, as most of our peaches were then (September 27th) gone from our fields, gardens and markets.

PEARS.

The display of pears was large and fine. And of these the best summer, autumn and winter pears were as follows:

SUMMER PEARS.

*Bartlett—An English pear; large, irregular ovate form; fine yellow color, with a russet brown, face towards the sun; very buttery, sweet, juicy and rich—the standard of excellence among summer pears.

AUTUMN PEARS.

*1. Beurre Bosc—A Flemish pear; with a long calabash-like neck, and a beautiful dark yellow russet color; buttery, with a rich and deliciously perfumed flavor.

*2. Beurre De Auyon—A Flemish pear; large, oblong, handsome, pale yellow color, with a buttery and delicious, juicy, vinous and aromatic flavor—one of the very best autumn pears introduced into our country by Marshall P. Wilder, of Boston.

*3. Beurre Diel—A Flemish pear of the largest size; obovate in form; and when ripe, of a bright, rich golden color, and a buttery, sugary, juicy and rich perfumed flavor.

*4. Buffum—An American pear; small, oval shaped, very handsome; brownish green at first, but when ripe, yellow, with a red cheek, brown dots, and traces of russet, and of a sweet, juicy and aromatic flavor.

*5. Dutchess De Augonleme—A French pear; very large, the largest of all good eating pears; yellow, tinged with red on the sunny side; a noble pear, buttery and very juicy and sweet.

*6. Flemish Beauty—A Flemish pear; large, oblong, and very handsome; of a pale yellow color, with patches and marblings of light russet, and at times a rich, reddish, brown face on the sunny side; very fine flavored, juicy, sugary and aromatic.

*7. Louise Bonne De Jersey—A French pear, large, with a long smooth neck, and a beautiful yellow color, and a brownish or glossy dark red cheek, buttery and very juicy, rich, vinous and aromatic flavor—a pear of first-rate excellence.

*8. Onondaga or Swan's Orange—An American pear, large ovate form, a rich golden yellow color when ripe, with many gray russet dots and occasionally a dull blush towards the sun, rather coarse grained but juicy and vinous in flavor.

*9. Seckel—A Pennsylvania pear, originating with a Mr. Seckel, near Philadelphia, quite small of size, of a yellowish brown color, with a lively red russet cheek and small gray dots, very handsome in shape and very juicy, sugary, spicy and aromatic in its flavor. It is the acknowledged standard of all pear excellence.

*10. Urbanisto—A Flemish pear of medium size, smooth, beautiful pale green color, with gray dots and a rich, sugary and vinous flavor.

WINTER PEARS.

*1. Beurre Easter—A Flemish pear, large, roundish oval form and a very handsome yellow color, with a red or russety cheek, buttery, juicy, sweet, aromatic and very fine flavored—one of the best of all late winter pears.

* Lawrence—An American pear of medium size, handsome, obovate form and pale yellow color, with dull green and small dark specks and russetings, with a juicy, sugary and rich aromatic flavor—a universal favorite.

* Vicar of Winkfield—A French pear, large, long shaped, pale green at first, but when ripe, of a pale beautiful yellow color, with a brownish red cheek, juicy and excellent for cooking and baking.

* Winter Nelis—A foreign pear of medium size, roundish, handsome form, yellowish green color, with many gray russet dots, and a buttery, juicy, sugary and aromatic flavor—the standard of excellence among all early winter pears.

All of the above pears marked with a * have been recommended by the *American Pomological Society*, as being among the best known summer, autumn and winter pears, and also the best adapted for successful general cultivation in our northern, middle and western States.

Mr. Frederick Seitz exhibited twenty-four varieties of pears, most of which were large and fine looking, but as their names were not made known, I am unable to give them.

GRAPES.

The display of grapes, both of native and foreign kinds, was large and fine, consisting of the various colors—white, yellow, green, blue, red and purple or black. To describe them all would require more space and time than I can afford. The best grapes for general out-door cultivation were as follows:

BLACK GRAPES.

*1. Isabella—An American grape; a native of our Carolina states, and called Isabella after Mrs. Isabella Gibbs, the wife of Geo. Gibbs, Esq., of St. Augustine, in Florida, but in 1818, when this grape came into notice through Mrs. Gibbs, a resident of Brooklyn, on Long Island, near the city of New York.

Bunches large, and grapes large, and of an oval shape and a dark purple, nearly black color and a pretty thin skin, covered with a blue black bloom; juicy and sweet with a musky aroma. This is the oldest and most popular grape yet in common use, as it ripens easily and early everywhere; and it has, when well ripened, but few superiors.

*2. Concord—This grape is a native of Concord, Massachusetts, where it originiated with Mr. Ephraim W. Bull, about the year 1843. Bunches large and grapes nearly round and larger than those of the Isabella, and of an almost black color, thickly covered with a black bloom. It ripens earlier than the Isabella, but is rather thick skinned and moderately juicy and sweet, but a pretty strong musky or foxy taste.

3. Israella—This is a *new* grape raised by Dr. C. W. Grant, of Iona island, near Peekskill, in the State of New York, from the seeds of the Isabella grape, planted in 1854. The Israella has large bunches and large grapes, of a very dark purple or black color, covered with a blue black bloom; it ripens before all other grapes, more than a week before the Hartford Prolific, and more than two weeks before the Creveling and Concord. The vine of the Israella is also very short jointed and hardy and leafy and productive, and its berries hang so long upon the vine as to dry them into sweet raisins; flesh juicy, very sweet, rich and aromatic in flavor, and superior in every way to its parent, the old and as yet very popular Isabella.

RED GRAPES.

*1. Catawba—This is a native of the Catawba river, in North Carolina. It was first brought into notice about the year 1823, by Major John Adlum, of Georgetown, D. C., who pronounced it our best American grape for making wine. Bunches from medium size to large, with large round berries of at first a pale red, and when fully ripe of a rich dark red color, with a moderately thick skin covered with a lilac bloom; flesh slightly pulpy, sweet and juicy with a rich vinous and musky aromatic flavor. But the Catawba grape ripens too late for any but quite warm and sunny positions. Major Adlum found it growing in the garden of a German near Washington city.

*2. Delaware—This is also an American grape, brought into notice by A. Thompson, of Delaware, in the State of Ohio, about the year 1838, and hence its name of Delaware. W. Thompson at first exhibited it at county fairs, under the name of the "Heath Grape," but he afterwards changed it to Delaware.

Bunches small, with small round grapes, of a clear, pale red color and a thin delicate skin; flesh without pulp, tender, juicy, spicy and very sweet—the standard of excellence among all grapes, both as a table and a wine-making grape. Its vine is hardy and an abundant bearer, and its berries are among the earliest of our grapes to ripen.

*3. Diana—This is also an American grape, having originated with Mrs. Diana Crehore, of Milton Hill, near Boston, in Massachusetts, from seeds of the Catawba grape, about the year 1838. The Diana grape resembles its parent, the Catawba; but it is much larger and ripens two weeks earlier. Bunches large, with large round berries, of a fine dark red color, with a rather thick skin, but a rich, vinous and aromatic flavor, and it ripens from a week to ten days before the Isabella.

4. Iona—This is also a *new* variety of grape, raised by Dr. C. W. Grant, of Iona island aforesaid, from seeds of the Diana planted in 1854. The

Iona has large grapes, of a thin skin, and a clear and beautiful red color, and a flesh without pulp, and very tender, with a sweet, rich, vinous and aromatic flavor and free from any musky or foxy taste. It begins to be good about the middle of August and ripens two weeks earlier than the Concord and three weeks before the Isabella, and still longer before the Catawba, and hangs long upon the vine, even drying there almost into raisins. It is a grape of great beauty and much promise, its vine being very short-jointed, hardy, leafy and productive, and its fruit is, in the opinion of some persons, even superior to the Delaware, both as a table and a wine grape. The Iona resembles the Delaware so closely that Dr. Grant says: "They may be regarded as counterparts of each other. We may say, with about equal truth, that the Delaware is a concentrated Iona or that the Iona is an enlarged Delaware. Both are sweet, rich, vinous and spicy, but the Delaware is the most concentrated."

Mr. Frederick Seitz, of Easton, exhibited the largest collection of grapes shown at the fair, consisting of thirty different kinds of foreign grapes, all large and of various colors. His black grapes contained the Black Hamburg, Black Frankenthal, Black St. Peters, &c. His red grapes included the Red Chasselas, the Grizzly or Red Troutignan, &c. His yellow grapes included the Golden Chasselas, &c., and his white ones the Muscat, Native, White Syrian, &c., all of which were grown by himself under glass—that is, in glass houses erected for the purpose, the said foreign varieties of the grape being too tender to be successfully grown in out-door culture in this part of America.

All of the above-described grapes marked * have been recommended by "*The American Pomological Society*," as very good and suitable for successful general out-door culture. The Israella and Iona grapes will, in all probability, soon be added to the list.

2. VEGETABLE DEPARTMENT.

The display in the various articles of this department was also very good, consisting of beets, cabbage, carrots, celery, citrons, onions, parsnips, potatoes, pumpkins, turnips, tomatoes, squashes, watermelons, apple-pie-melons, &c. I have only room to describe the best potatoes on exhibition, this root or tuber being too valuable to be overlooked, since it supplies the place of bread in most of our families.

POTATOES.

1. Mercer or Neshannock—This potato is called so because it originated with Joseph Gilkey, on the Neshannock creek, in Mercer county, Pennsylvania, about the year 1813. It is a handsome, medium sized, white skinned and very mealy white-fleshed potato—the admitted standard of potato ex-

cellence—but as it is a rather shy bearer, it is giving way to our newer and more productive sorts.

2. Mercer Seedling—This potato is about the same size and of the same quality, but rather handsomer than the Mercer, being raised from the seed balls of the Mercer. But by whom, and when and where it was raised, I am not able to say.

3. White Pink Eye—This is a large, roundish, white skinned and white fleshed potato, with pink colored eyes near the surface of the flesh—very productive and of good quality for table use.

4. Yellow Pink Eye—This potato is similar in size and shape to the White Pink Eye, but is yellow skinned and yellow fleshed with pinkish eyes. It is of good quality for a yellow fleshed potato, but our yellow fleshed potatoes are always heavier and tougher than white fleshed kinds, and so are inferior in quality for table use.

5. Early June—This potato is called so from its growing crop being fit for table use early in June. It is a pretty large, roundish or flattish white skinned and white fleshed potato, with but few eyes but slightly imbedded in its flesh, and it is sometimes tinged with red colorings and blotches, particularly around its eyes—quality good.

6. Bermuda—This potato is called after the Bermuda islands in our West Indies, whence it came. It is a large and handsome, bright red skinned and yellow fleshed potato, with large eyes moderately sunk in the flesh, but it is only of second rate quality for the table, and after doing well for a few years, decreases rapidly in productiveness.

7. Cuzco—This is one of the seedling potatoes produced by the late Rev. Chauncey E. Goodrich, of the State of New York, who spent fifteen years of his life in successful experiments to produce new varieties of the potato. The Cuzco is a large and rather long, white skinned and white fleshed potato, with deeply indented eyes. It is very productive and fine for marketing, but of only second rate quality for table use.

8. Early Goodrich—This is another of Mr. Goodrich's seedlings, bearing his own name. It is called the Early Goodrich, from its ripening very early, two weeks earlier than the Early June, the Mercer, Prince Albert and Buckeye. It was raised from the seed balls of the Cuzco just noticed. It began to attract notice for the first time in 1864, when it was distributed through different parts of our country in small lots for trial, and proved itself to be a very productive and early ripening potato of superior excellence. It is a pretty large, smooth and handsome white skinned and white fleshed potato, with small eyes but moderately imbedded in the flesh, solid to the centre, a long keeper and of first-rate quality, being, in the opinion of many good judges, the very best early ripening summer potato in America.

9. Harrison—This is another of Mr. Goodrich's seedlings, also raised

from the seed-balls of the Cuzco, and by him called Harrison, in honor of his friend, A. W. Harrison, of Philadelphia, who took a peculiar interest in Mr. Goodrich's efforts to produce new and superior kinds of this valuable root for table use. The Harrison is a pretty large, very thin, smooth, oily-like and beautiful white-skinned and white-fleshed potato, solid to the centre, and with but few and well developed eyes near the surface of its flesh, enormously productive, a long and good keeper, and of first-rate quality for table use in winter. Mr. Goodrich informs us that he had raised at the rate of six hundred bushels of it to the acre, when it was only three years old, from the seed-balls, and that he had raised over sixteen thousand new varieties of potatoes from potato seed-balls, and that of all these he considered the Early Goodrich and the Harrison, twin brothers from the Cuzco, as being the very best potatoes in America for summer and winter use.

10. Michigan White Sprouts—This is also a new variety, raised somewhere in the State of Michigan. It is a long, thick, white-skinned and white-fleshed potato, with numerous well-developed eyes deeply sunk in the flesh. It is said to ripen quite early, and be of first-rate quality for table use.

11. Hansworth Early Potato—This also seems to be a new variety. But having no memorandum of it in my note book, I cannot describe it. Major John P. Rutherford, the chairman of its examining committee, however, in noticing it, says: "This potato is two weeks earlier than any other potato, and grows only six inches in height, good size, excellent quality. We would recommend it for cultivation."

The foregoing descriptions of our fair's best apples, pears, grapes and potatoes will be very useful to those who want to procure the best, and also to our judges who may hereafter desire to make comparisons between said described fruits and potatoes and such other old and new varieties thereof as may, year after year, be exhibited at our State and county fairs.

3. LIVE STOCK DEPARTMENT.

The display of horses, cattle, sheep and swine was fine. The cattle embraced superior specimens of full-blooded Alderney, Devon and Durham, or short horn bulls, cows, heifers and calves, as well as very good native and grade animals.

The sheep consisted of the Cotswold, Leicester and Southdown, and a few other choice breeds. The display of swine was not only large, but very fine. The principal and best breed consisted of the "Chester county white" pigs, about seventy-five or eighty in number, and of all ages from three to fifteen months old, boars, sows and little pigs, mainly exhibited by the three brothers, Francis, Marshall and Richard Strode, of West Chester, Chester county, Pa. All of these pigs were very large for their age, and very handsomely formed, and white all over from snout to tail, not having the least black or other colored spot or speck upon their bodies. Some fine specimens of the Essex, a black hog, and a few other breeds of swine, were also upon the ground, but they were neither so large nor so handsome as the "Chester county whites" of the same age. We have many white pigs in our different counties that are called Chester whites, but they are far inferior to the *true* Chester whites shown at our last State fair by the Messrs. Strode and others. Our display of poultry was a failure, entirely too small. What has become of my friend David Taggart, Esq.'s, poultry, his huge Shanghais, Chittagongs, &c.? Shall we never see them again?

4. GRAIN AND GRASS SEED DEPARTMENT.

This department of our fair was also good. For it included superior specimens of red and white wheat, also rye, buckwheat, barley, oats, corn, white and yellow, flax, timothy and Hungarian grass seeds, &c. Among the red wheats we had the Red Mediterranean, Red Lancaster, &c., and among the white wheats the White Mediterranean, Boughton or White Tappahannock, &c.

5. DOMESTIC MANUFACTURES.

This department of our fair embraced—so far as the refreshments or real substantials of life are concerned—very fine specimens of wheat flour, cakes, doughnuts, butter, apple butter, lemon butter, honey, lard, cheese, cider vinegar, jellies and preserves made of apples, cherries, peaches, pears, plums, quinces, grapes, tomatoes, elderberries, &c., put up in air-tight vessels or in stone or crockeryware—pickles, made of cucumbers, mangoes, nasturtiums, tomatoes, &c., put up in like manner—and wines, made of the blackberry, cherry, currant, grape, raspberry, &c. Most of these things were nice, and some of them were extra nice and good. But the display of bread, cake, pies, custards and boiled ham was far less in amount than it should have been.

Our fair sex of Pennsylvania are noted all over our Union of States for being very nice and superior cooks and bakers, and we trust that our next State Fair, wherever held, will give us a very full display of all these and other nice eatables and drinkables, got up and exhibited in the very best style. It will be an honor to our ladies, both married and single, to win the highest premiums in these contests when sharply tried. For a good baker and cook is a very necessary and comforting manager in all of our households, and our young lasses therefore should everywhere try to excel in this great and valuable art, or rather art and science. For skill here is of constant and far greater importance to our families than all of the piano and other instrumental music—making skill in our land. We have nothing to say against instrumental and vocal music, paintings, pencil drawings, &c., as they are all right and proper in their place and fine accomplishments. But our fixed rule should always be to teach our daughters housewifery *first*, and then afterwards as many of the above accomplishments as we can. But if we cannot do both, let us by all means give them a thorough knowledge of housewifery in all of its details, as this is the most important mere wordly education, that a woman, designed to be the head of a family, can have.

6. AGRICULTURAL IMPLEMENTS AND MACHINERY.

The display of articles in this department was uncommonly large, good and attractive. *For working the ground*, we had plows, harrows, cultivators, rollers, hoes, spades, shovels, &c. *For sowing and planting seeds*, we had grain and grass seed drills, cornplanters, double-rowed, &c. *For cutting and gathering grain and grass*, we had reapers and mowers in great variety, also scythes, grain and grass cradles, hay spreaders, horse hay rakes, forks, &c. *For threshing and cleaning grain, &c.*, we had threshing machines, fanning or wind mills, clover seed hullers, corn shellers, smut machines, &c. *For cutting straw, &c.*, we had straw cutters, hay cutters, cornstalk cutters, &c. And generally we had apple parers and grinders, cider mills, churns, force and lifting pumps, axes, wedges, chains, dung forks and hooks, hay and cattle scales, farm gates, garden and yard gates, stump and rock extractors, &c., &c. And the most of these articles have now become so perfect that it is a very nice and difficult matter for any person to say which of them all are the best to answer the purposes they are designed for. And hence I have refrained from giving my own opinion, which might be worthless, if given.

7. AGRICULTURAL HALL ARTICLES.

The *lower* story of this hall, which I have already described, was completely filled with buggies, carriages, cabinetware, hardware of all kinds, cutlery, house furniture and an almost endless variety of silver, iron, tin, brass, copper and wooden wares, and a long list of other notions too tedious to mention. The *upper* or *second* story was equally full of all sorts of sewing machines, &c., readymade clothing, made of silk, cotton, wool, &c., consisting of shawls, capes, muffs, gloves, mits, stockings, hats, caps, bonnets, boots, shoes, &c.; also blankets, bed spreads, quilts, carpets, oil-cloths, saddles, bridles, hames, fly-nets, horse collars, trunks, valises, leather and leather bands for wheels in machinery, &c., in great variety, plain and ornamental; also perfumery and fancy notions of every kind, pictures, paintings, natural curiosities, &c., some of which will be noticed hereafter.

8. FLORAL AND FRUIT TENT ARTICLES.

In the centre of this floral tent, which I have already described, there was a *raised mound of artificial work*, composed of intermingled earth, gray and blackish-colored stones, roots, green and half-dead leaves, moss, branches of small trees, and bushes and vines of various colors, just as nature formed them in our mountains and glens, the whole resembling a wild, cone-shaped rock scenery of rare beauty, with a *water-fountain* spouting out constant jets of water from the centre of the mound. This mound, again, was surrounded with an artificial ditch and pool of water, in which artificial ducks, very closely resembling living ducks, were floating around as if swimming. Immediately outside of this water-pool or ditch there was an *elevated* artificial border or ring of earth covered with green sod and planted, here and there, at suitable points, with green and beautiful little evergreen trees and bushes. Outside of this green, elevated border there was an avenue or foot-walk, and outside of that a large circular collection of richly colored living flowers, vines, creeping plants, bushes and little trees of rare beauty, both evergreen and deciduous, and large glass vases containing various kinds of beautifully colored fish, &c., swimming about in the water—all very tastefully arranged to please the eye and impress our hearts with God's goodness in giving us so many beautiful things of nature to look at, study and admire, and draw lessons of wisdom and piety from. And outside of that again we had another avenue or walk, and then a range of rough board tables or platforms covered with apples, peaches, pears, grapes, &c., and then another avenue or walk, and outside of all another like range of tables groaning under loads of the very choicest grain and grass seeds, corn, cabbage, citrons, melons, potatoes, pumpkins, squashes, tomatoes, turnips and every kind of vegetable, both of the field and of the garden, useful for food and necessary to form the grand staple of life for both man and beast. But the reality far exceeded in beauty and importance anything I can write, descriptive of this beautiful tent and its rich and varied contents. It is no wonder that it was always full of spectators, who gazed with delight on these concentrated evidences of God's protecting care over and goodness to his erring creature, man.

9. NATURAL AND INDIAN CURIOSITIES.

Among the natural curiosities we had a large and fine display of *sea shells*, old ocean's beauties, both large and small, of many different shapes, sizes and colors, very beautiful in form and most exquisitely colored, as their rich colors and shadings and interbleadings of colors of various hues far surpassed any thing that man can make. These shells were exhibited by P. G. Gallagher, of Philadelphia, and Amos Seip, of Easton.

Dr. Edward Swift, of Easton, exhibited in nicely arranged and labelled, little contiguous boxes, a fine collection of rare and beautiful *minerals and stones*, nature's curiosities of greatly diversified shapes, colors and textures, supposed to be about one thousand in number—a rich mine for the student of mineralogy and geology.

Dr. Swift also exhibited a large collection of rare and very fine Indian curiosities, consisting of about three thousand *arrow heads* of many different shapes and of various sizes and colors, made by "the poor Indians" out of flint and other hard stones. These arrow heads were fastened to the heads of his arrows and used by him for shooting the deer, bear, elk, wild turkey, squirrel and other wild game. His collection likewise contained about three hundred larger stone implements, such as hatchets, hammers, &c., very ingeniously constructed by the red man for cutting, hammering, &c., in the making of his various works, such as arrows, arrow heads, bows and bow strings for shooting his arrows, &c. All of these Indian relics were very neatly and tastefully arranged, in regular rows, on a frame about four feet wide and ten or twelve feet long, and hung up against the wall of the Agricultural Hall, thus presenting to the eye a full and satisfactory view of the whole at a glance; the larger and heavier implements being at the bottom, and the next row decreasing in size, on upwards to the top of the frame. The making of this collection must have cost Dr. Swift a vast amount of time and patience, extending through a long series of years. But what are these rude implements of the Indian, ingenious as they really are, when compared with those of the white man, made under the guidance of science and a correct knowledge of scientific practical principles? Why a mere nothing. Still, the Indian's are very curious, interesting and valuable collections, as they show us the power of man's mind in its rudest forms, and what he has done and can do under the guidance of the mere light of nature. And as the Indian himself is rapidly passing away before the quick and powerful encroaching tread of the white man, these and other relics of the noble red man's native skill richly deserve collection and preservation as instructive lessons to our own and future generations of the Anglo-saxon race.

10. AMBROTYPES, CRAYONS, DAGUERREOTYPES, PAINTINGS, PENCILLINGS AND PHOTOGRAPHS.

Quite a variety of all these branches of the fine arts was on exhibition, presenting rare and beautiful views of landscapes, rustic scenery, dwelling houses, animals, men, women and children and the like. My notes of these interesting articles, however, are entirely too brief and general to allow me to do justice to any of them by any description that I can give of them; and hence I deem it best to refrain from going into particulars. Still I feel free to say that the crayon drawings, pencil drawings and landscape paintings shown by Miss Eliza Haldeman, of Lancaster county, Pa., were, according to my judgment and taste, of first-rate excellence for originality of design, perfect naturalness and beauty of execution. And this was equally true of the productions of some of the other exhibitors, whose names are not on my note-book and cannot now be reliably re-called by my memory.

11. VIEW OF OUR FAIR AS A WHOLE.

On the whole we can safely say that our State Fair for 1866 was a decided success, as many persons declared it to be the best fair ever held in Pennsylvania. And an intelligent stranger, who happened to be present, informed us that he had witnessed about two hundred different county and State agricultural fairs in our northern and middle States, including the States of New York, Ohio, Indiana, Illinois, &c., and that our Pennsylvania State Fair for 1866 was thirty per cent. better than any he had seen out of that two hundred. Surely that is very great encouragement for us to persevere in our efforts, to collect and spread useful agricultural, mechanical and manufacturing information through the medium of our State fairs. And I am convinced that we can do better than we have yet done if we only try aright.

12. CLOSING PRACTICAL REMARKS.

And now permit me, in conclusion, to make some practical remarks that may be beneficial to us hereafter.

An agricultural fair may be a good and even a very good one in point of fact, and yet make but an indifferent or poor show on paper, if described as our State fairs usually have been. For, in reading the published account of our fairs, either county or State, what do we find? Why merely the printed fact that such a particular person, named, drew a certain specified premium of money or a diploma for having exhibited the best horse, bull, ox, cow, pig, wheat, corn, potatoes or the like, that was shown at the fair; for our published proceedings very seldom give us *a description of the thing itself* that drew the premium, and so leave us all, who did not attend the fair, in utter ignorance of its size, color, beauty, quality and value—the very points that ought to be extensively known to make the fair accomplish the good it was designed to do.

Whenever the judges, who examine the fair articles closely and decide upon their respective merits, and award the offered premiums, find any useful thing there, no matter what it is, that possesses *unusual excellence* to recommend it to our notice and favor, they ought, in their award or report, to give us a plain and correct description of it and its various extra merits, in order that the knowledge of the same may be preserved in and widely made known by our published transactions; but this is very rarely done, either because our judges are too much in a hurry to do it, or because they deem it unnecessary to do it, for surely they can write well enough to do it. And what is the consequence? Why just such a poor and meagre printed account of our fairs as we have had for years past, and still have—nothing but long rows of dollar figures, preceded by the names of the successful competitors at the fair and the names of the articles that drew the premiums!—a loose and indefinite kind of knowledge, that conveys useful information to no one, and so does and can do but little, if any, good to any one. And that is not the whole of the evil, for it costs the society, county or State a large amount of money to publish this mass of stuff, that is in a great measure useless when published. And hence the omission of our judges to describe extra-fine premium articles in their awarding reports is a serious error or failure of duty, that ought, hereafter, to be carefully corrected; and if that part of their report, and *that alone*, were published, in connection with our annual address and our premium essays on particular subjects of agricultural importance, it would give us a *small* but very interesting and valuable volume of our annual transactions—a volume far superior in every way to our great, big, costly book, that has, for the reasons already given, but little in it that is really worthy of preservation. And perhaps it was for some or all of these reasons combined that the Executive Committee of our Pennsylvania State Agricultural Society offered a premium of $50 "*for the best report or history of the exhibition*" or fair just closed at Easton, to the end that they might thus procure such a sketch of the most valuable things and doings at our said fair as would supply the usual defects of our judges' reports and the like; and if said offered premium will do this, and continue doing it if the practice is continued, the money paid for it will be well spent, as it will secure us a valuable and permanent record of each of our State fair's best things and doings, for future use and benefit. But the best plan of all undoubtedly would be for our society to appoint a regular reporter for this purpose, at an annual fixed salary—some man of well-known competency and industry for this task,—as that would make us sure of obtaining this desirable and much-needed information in the very best and most reliable and valuable form; and then our society would begin to do a vast amount of good, compared with what we are now doing.

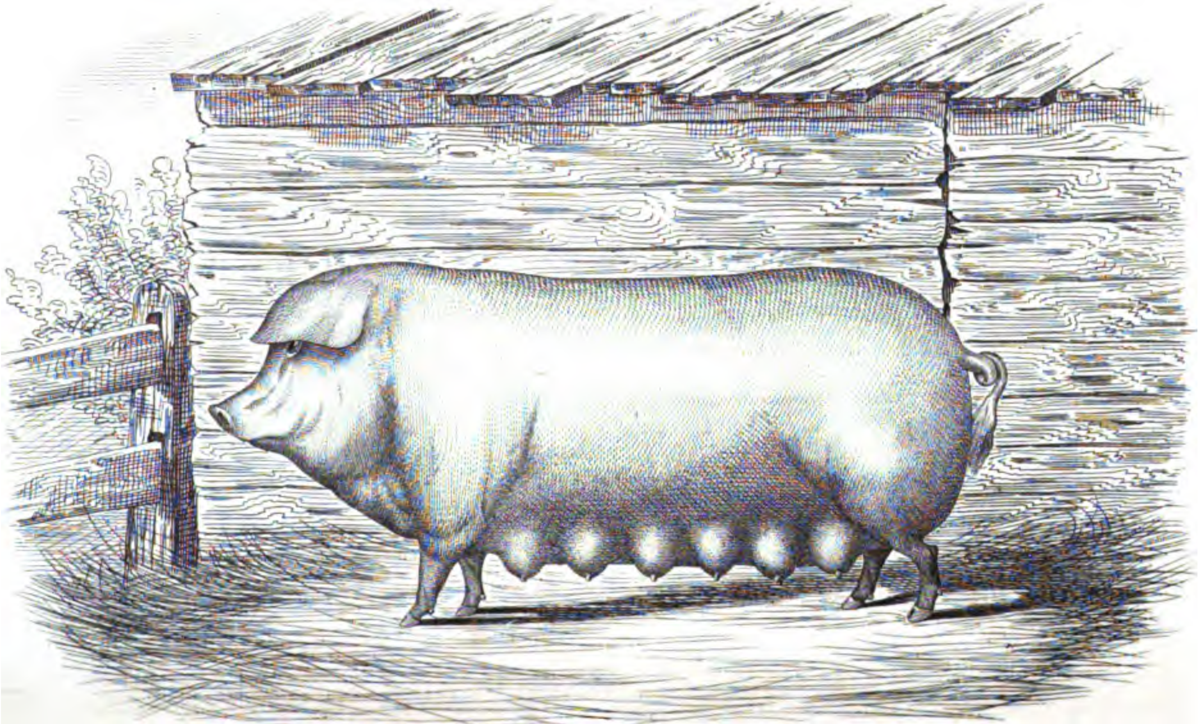
EXHIBITION OF 1867.

DESCRIPTION OF THE FIFTEENTH ANNUAL EXHIBITION OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY, HELD AT PITTSBURG, PA., SEPTEMBER 24, 25, 26 AND 27, 1867, BY WM. B. REDFIELD.

The fifteenth annual exhibition of the Pennsylvania State Agricultural Society opened to the public at eleven o'clock on the morning of Tuesday, September 24, 1867. At three o'clock of the same day, his Excellency Gov. Geary, under escort, arrived at the grounds, and was received at the eastern entrance of the enclosure by Generals Knipe and Sweitzer, Captain Morgan and others *en cavalcade;* and, under command of General Knipe, the procession passed around the race track, and halted in front of the amphitheatre. After the Great Western band had played a patriotic air, General R. Biddle Roberts, who had been selected by the reception committee to deliver the address of welcome, stood up in his carriage, and in a pleasing discourse of medium length, spoke of the honor conferred upon the society by the acceptance of the invitation given the Governor to open the exhibition; referred to his achievements in the field; his distinction in the Commonwealth; and to the confidence which the loyal people of Pennsylvania reposed in their chief magistrate; that it was a matter of local pride to the citizens of Pittsburg to have an opportunity to testify their approbation of his use of the veto power to preserve them from the encroachments of a monopoly, and for which (through the speaker) they tendered their heartfelt thanks. He also alluded to the exemption from taxation of the landed interests of the State as inaugurated by Gov. Curtin, and successfully carried out by his successor, having greatly aided the material interests of the State, agriculture forming the basis, causing commerce and manufactures to go hand in hand; and concluded by hoping that the Governor would see such a display of the agricultural wealth of the State, as would form a pleasing recollection, and a sincere subject of gratification.

GOV. GEARY'S ADDRESS.

Gov. Geary, also standing up in his carriage, responded to Gen. Roberts, thanking him and the citizens of Pittsburg for the enthusiastic reception he had received. He was gratified, he said, to meet so many of his old friends, companions of his youth, and comrades on the field. Hundreds of historic recollections of Pittsburg throng the memory, and at the present time its people display incontestible evidences of its prosperity and progress. In response to the compliment paid to his services in the field,



LADY.

Bred and owned by E. B. ASHBRIDGE, Breeder, Willistown Inn, Chester County Pa. Winner 1st Prize Penna. State Fair, Scranton 1870.

he said, I only did my duty, and what I have done has passed into history, and belongs to the people—it is their property. He then proceeded to deliver his inaugural address, returned thanks for the honor conferred upon him, rehearsed the origin of the society, and the difficulty of convincing the people of the material benefit that such a society would confer on them. He depicted its rapidly increasing interest, its steady progress, notwithstanding the fearful struggles of a four years civil war, which called the farmer from his plow, the artisan from his workshop. In conclusion, he spoke of the successful closing of the war, the present attitude of our Republic as a strong fortress, tested by the fierce storm of contest, shaken but not broken, and still the free asylum of the oppressed—the home of freemen. The industry of the country he claimed should be protected from foreign competition—the sanctity of the laws should be reverently maintained, and the starry banner of our country should be upheld and looked upon as the bow of promise, and the undiminished emblem of our unity as a great people. Then every citizen of the Republic will realize the beauties of civilization, and in the cultivation of the refinements and enjoyments of education, appreciate and fully realize that his life is emblematical of the beautiful motto of our beloved Commonwealth, "Virtue, Liberty and Independence."

At the conclusion of the address, the Governor was escorted to the judge's tent, where he was introduced to a number of citizens, after which he visited the various departments. Some 3,000 persons were on the grounds, but the arrangements of the different departments were not completed until nearly noon of the next day.

ARRANGEMENT OF THE GROUNDS.

The exhibition was held on the grounds of the Allegheny County Agricultural Society, at Iron City park. The main entrance was from Butler street, Lawrenceville, which was graded and rolled, and covered with a thick layer of tan bark. Within a few yards of this entrance a ticket office was erected, so arranged as to avoid all crowding or jostling. This gate was for pedestrians. Upon the eastern side of the park was the Lawrenceville entrance, kept open for vehicles and horses. A ticket office was erected here, and near it the office of the Secretary and his clerks. There was also a third place of entrance at the foot of the steep hill opposite the Pennsylvania railroad flag station. To the right of the gate, at the main entrance, was a well constructed building of timber, in form of a Greek cross. This was the hall of Fine Arts. Beyond this was a large covered amphitheatre, capable of seating one thousand persons, commanding a full view of the trotting course. A short distance from this amphitheatre was a frame building, arranged with stands in the centre and broad aisles on either side.

This was used as the Domestic Hall, near which was the Fruit and Vegetable Hall, octagonal in form, with elevated floor and double circular aisles. Situated on the brow of the hill, near the centre of the park, it afforded a prominent position for the band, who were stationed on a raised platform connected with it. Looking out from the entrance of this pagoda, "Fountain Circle," a beautiful piece of landscape gardening met the eye. This was several hundred feet in diameter, hedged in by a profusion of cedars and other evergreens. Four evergreen arbors, elaborately designed, were placed equidistant around the inner segments of the circle, under one of which was chained a noble specimen of the American eagle. Choice plants and flowers were scattered around the enclosure, and in the centre was a large circular basin, walled around with stone and coke, and mantled with various colored mosses and ferns. A pyramid of rustic rock-work surmounted the centre of the basin, from the apex of which arose a graceful fountain. Below this were revolving jets, and from the sides of the basin jets shot out toward the central pyramid. The basin was filled with clear water in which sported gold and silver fish. Shaded by great trees, it formed a cool and delightful retreat, and reflected great credit upon the skill of its originators, the celebrated gardeners, the Elliott Brothers, of Pittsburg.

Further down, and near the Lawrenceville entrance, was the large tent of A. Boyd Hamilton, Esq., President of the association, which was also the headquarters of General Knipe, the marshal, and General Sweitzer, Captain Morgan and Messrs. Harvey and Keyser, assistant marshals.

The conservatory was of canvas, placed on the slope of the hill, nearer the race course, in the centre of which was constructed another revolving fountain, two fan and two mist fountains, also the work of the Messrs. Elliott, and adjoining this was Knox Hall, erected and occupied exclusively by the celebrated seedsman and florist, J. Knox. Here was also a bit of choice landscape gardening, designed by General James S. Negley, of Pittsburg. Rocks, ferns, falling waters, rich mosses, beautiful flowers, a basin of limpid water and the music of birds, displayed all the beauties of a wildwood haunt.

The lower side of the race course was reserved for the reception of animals and machinery. Two double lines of cattle sheds ranged the side-hill from near the Secretary's office to the eastern corner, from which a long row of horse stalls ran back to the vicinity of the main entrance. Nearer the carriage road, seventy-two covered pens for sheep were so constructed as to combine all the advantages of pure air and convenience in tending. The swine pens were near these and similarly arranged. The poultry coops were stationed near the carriage entrance.

Power or Mechanical Hall was merely a covered plot of ground between the lower portion of the race course and the space allotted to stock, under which such articles belonging to this division as needed shelter were placed, the remainder being scattered about in its vicinity.

Near the centre of the park was a branch office of the Western Union Telegraph Company, under charge of Mr. Hauff. Separate buildings were erected by the agents of the Wheeler & Wilson, Grover & Baker and the Weed Sewing Machine Companies, for their especial use, and one under the auspices of the Grand Army of the Republic, for the sale of articles for the benefit of soldiers' widows and orphans. Not the least attractive feature was the numerous booths erected in all parts of the park for the sale of refreshments.

THE EXHIBITION OF STOCK.

The number of cattle upon the ground was unusually small for a State fair, and would scarcely do credit to an ordinary county fair. Those shown, however, were worthy of mention. There were no foreign imported cattle on the ground. In class II, (2d,) consisting of Durham short horn and Devon cattle, James M'Kelvey, of Wilkinsburg, Allegheny county, exhibited nearly all the short horn cattle, among which was a very fine four year old Durham bull; Greenwalt & Kahn, of Allegheny city, exhibited the two second best two year old heifers, and John Sturm, of Lawrenceville, the best thoroughbred cow. P. H. Hacke exhibited three beautifully marked Holstein cattle—a bull, cow and calf, which attracted much attention. Only one Alderney bull was on exhibition, owned by W. A. Garreth, Fourth Street road. Of Ayrshire cattle, W. S. Bissell, of Petersburg, exhibited a three year old cow and a heifer between one and two years old, thoroughbred, both of which received first premiums. J. F. Bellstein, of Allegheny city, received the first premium on fat cattle, and James M'Kelvey, of Wilkinsburg, on a herd of fifteen cattle and six heifer calves. John M. Berry, of Clokeyville, received the first premium for the best single fat steer—a fine animal, which weighed about three thousand pounds. Of native and grade cows, James M'Kelvey, of Wilkinsburg, Thomas Dalzell, of Enon Valley, and G. W. Evans, of Allegheny city, received premiums.

The horses on the ground made their first public entree in the ring on Wednesday morning at nine o'clock, and some very fine specimens, in the different classes, were exhibited. In class VI, thoroughbred stallions, David M'Gaw, of New Brighton, received a silver medal. For speed, the trotting horse, "Champagne," owned by Alex. King, took the first premium of $100, and George W. Evans, for his trotting horse, "Triple John," took the premium of $50. The pacing mare, "Lady Kelly," trotting colt, "Woolford," and a bay pacing horse, owned by Samuel White, also took premiums. The heaviness of the race-track and the thick dust were of great detriment to trials of speed, and it can hardly be said that a fair test was made of their movements in the ring. There were several pairs of matched horses worthy of mention, especially the large draught black, belonging to Phelps, Park & Co., which took the first premium. A pair of farm horses and a pair of farm mares, owned by James F. Gabely, of Washington, also took premiums. Dr. Anthers, of Pittsburg, exhibited a beautiful pair of matched sorrel horses, trotters, which received $40. J. E. Wright, of Finleyville, the second premium for a pair of matched farm mares. John M'Kelvey, of Wilkinsburg, had the best family horse; James Wilson, of Pittsburg, the best saddle gelding; F. G. Brereton exhibited a good family mare; M. D. Hays, of Buchanan P. O., a fine mare; John Wright, of Washington, a saddle mare. All of which received premiums. The competition in class IX was very close. First premiums were awarded to H. Love, Petersburg, for stallion, and James W. Knox, Pittsburg, for a three year old filley. In class X, stallions and mares of all work, Wm. Wallace, Lavettsville, Westmoreland county; Alex. King, Pittsburg; Robert Patton, Foster's Mills, exhibited light stallions. George E. Walt, Tallacarty, Allegheny county; Jacob Lose, Greensburg; Robt. Patton, Foster's Mills; James Hastings, Pittsburg, and J. C. M'Causland, of Greensburg, heavy draught stallions. A fine, dark brown, heavy horse, weighing one thousand nine hundred pounds, named Tom, was also entered by M'Causland, who refused three thousand dollars on the ground for him. Geldings were exhibited by George Pillon, of Springville. Hiram Shearer, Burd P. O., Westmoreland county, exhibited a fine brood mare.

The collection of jacks and mules was very good. A native Spanish jack, belonging to Robert Boyd, of Shirland, Allegheny county, took the first premium of $20; two fine jennets, by D. S. Carothers, of Monroeville, Allegheny county, and G. W. Rushenberger, Hollidaysburg, also received premiums. A. Nixon, of Woodville, Allegheny county, exhibited a mule, premium $5 00. There were several jacks and mules of an inferior grade. In this class were also several very small ponies from the Shetland and Orkney islands.

The department of sheep, though not large, comprised some superior grades. Of fleeces, but four were entered. Joshua White, Washington, exhibited a fine Saxony fleece, and a Paulan Merino fleece, and William A. Herriot, Westmoreland county, a Spanish Merino fleece, all of which received awards. Glenn & Bro., of Noblestown, exhibited a pair of fine ewes; R. Perrine, of Patterson's Mills, a fine ram and his progeny; also a fine ram lamb. Imported and thoroughbred sheep were exhibited by J. G. Strean and J. E. Wright, consisting of four pens of twenty-five ewes, fine wooled, three rams and one ram lamb. Spanish wooled sheep (merinos) were exhibited by Templeton & Miller, Robert Perrine, Glenn & Bro., William A. Herriot and S. T. Rhey. The flocks of the Messrs. Wright, Strean, and Glenn Brothers were particularly noticeable, as were also the Cotswold and Southdown varieties. Two pens of Cashmere goats also received premiums.

The exhibition of swine, though small, was good. The principal breed entered was the Chester white. Premiums were awarded to the Messrs. Stroud, Love, Young, Jr. & Co., Ashbridge, and G. Boyd, Jr. & Co. Of poultry very few varieties were entered. There were only four exhibitors, among whom John Owens, of Pittsburg, had a good collection of Black Spanish fowls and also several pair of ducks; Cornelius Scully, Pittsburg, a pair of bronze turkeys; and Henry Blythe, Allegheny city, many varieties of fancy pigeons, all of which took premiums.

AGRICULTURAL IMPLEMENTS.

The space for agricultural implements was well filled. In class 17, there were Rider's potato and sub-soil plows, corn and hillside plows, and a variety of harrows, exhibited by Hall & Spear, Spratt, Jones & Co., Beckham & Long, and John Hall & Co., of Pittsburg. Josiah Risinger, of Homer, Indiana county, exhibited a large hillside flow, and R. E. Sprink, of St. Lawrence county, N. Y., a patent self-cleaning plow coulter of his own construction. There were twenty-eight reaping and mowing machines shown. Beckham & Long received the first premium for the "Junior Buckeye Reaper;" the second being awarded to J. F. Seiberling, of Massillon, Ohio, for the "Excelsior Reaper." The best mowing machine was the "Kniffen," exhibited by C. G. Kniffin, of Worcester, Mass. This machine is lightly constructed, all the castings being tutelar. The gearings are superior, and the draft at a very low point. By the simple movement of a lever, the machine is at once thrown entirely out of gear. It is the only machine in use that accomplishes this at one movement, so it can be moved to any part of the field without the motion of the cogs. The knives will work in any position. A reaper attachment can be made, and it is most economical of power. J. Knox & Co. made a very creditable exhibition of horse powers, threshers, hay and vegetable cutters and corn shellers. Mr. J. C. Barkley, of Johnstown, exhibited the "Badger Corn Sheller," noted for simplicity, cheapness and durability. It is worked by a lever instead of a crank, making the work easier and more speedy. Beckham & Long, White Bros. & Co. had entries in this class, as also William Brady, of Mount Joy, Lancaster county; A. C. Danchy for the Crawford County Fanning Mill Company, a grain separator and fanning mill, a new invention patented last March. There were other machines which for want of power could not be put into operation. Pumps, cider mills, churns and washing machines were in abundance. Double acting, anti-frost, chain, steam and well pumps were from Bailey, Farrell & Co., and Moseby, Rahm

& Co., of Pittsburg, the former of whom entered a patent water elevator. Churns from J. Knox, D. C. Langsdorf, of Mechanicsburg, and John G. Taylor, of East Bethlehem, were exhibited, one called the Wescott Churn, being worked by a patent adjustible dasher with a lever spring of steel, cheap and durable; it can be worked by a child ten years of age. Churn-power and dashes by A. B. Smith & Co., of Rochester, Beaver county, John Christy, of Stepping Rock, and D. E. Langsdorf; also a churn dog power by J. Knox. In this class was the wonderful Hydraulic Cow Milker, exhibited by Otis P. Colvin, of New York city, and tested on the third day of the exhibition with success, gaining an award of a silver medal. The operation is milking by suction or hydraulic pressure. The milkers are self-adjusting, milking all the teats at the same time, imitating the movement of the calf perfectly, even to bunting. It is said cows like to be milked in this way. Among the farming implements were cultivators, grain drills, corn and potato planters and seed sowers. The Buffalo (N. Y.) Manufacturing Company exhibited a clover roller for which they received an award. The display of farming tools embraced horse rakes, shovels, manure forks, scythes, snaths and hay knives. Hall & Spear, Pittsburg, exhibited the largest display of their own manufacture, and Spratt, Jones & Co. the second best, while J. Knox had the largest collection not manufactured by himself.

WAGONS, CARTS, CARRIAGES, &C.

Nothing new in this class was observed, the superiority of the different styles resting in their strength, durability and excellency. Harper, Gutman & Co., of Allegheny city, and Phelps, Parke & Co., of Pittsburg, furnished heavy wagons and carts; Smith & Ballard received the first premium for spring wagons of finish; Mertz & Riddle, of Ravenna, Ohio, a one-horse family carriage of superior workmanship; also a collection of light carriages and buggies; Campbell & Stoner, of Pittsburg, a fine family phæton; Cochran & Wininger, of Lancaster, Pa., a beautiful single top buggy; Workman, Moore & Co., of Allegheny city, a falling top barouche, and the Royal Wheel Company, of Cincinnati, O., carriage and wagon work, for which they received a diploma.

STEAM ENGINES, HEAVY CASTINGS, SAWS, &C.

Only two steam engines were in operation, one manufactured by George Resick, of Pittsburg, with balance slide valve, which was awarded a bronze medal. This furnished the motive power for the hall. Another, with patent valve and piston, manufactured by Smith & Porter, received a bronze medal for the engine and particular notice of the piston packing. Logan, Gregg & Co. exhibited a one-ton and a two-ton patent pulley block; Fairbanks, Morse & Co., a valuable assortment of scales; J. F. Keeler, of Pittsburg, a hay and stock scale, with pendulum attachment; Beckham & Longer, portable grist mill; Lockhart & Co., spiral and plain copper and iron lightning rods; Dr. T. J. Kindelberger, of Cincinnati, Ohio, a double centre vent tubular water wheel; R. S. Holston, Miles, Trumbull county, O., climax water wheel; P. Hayden, Allegheny city, a model brick machine, and Joseph Isenburg, M'Connellstown, a boiling machine; E. S. Blake, of Pittsburg, a rock and ore crusher; the Keystone Axe Works, a cast iron vice, steel saws, &c.; C. E. Baum, smut machine; Shephard, Myers & Co., a smut machine, and Myers & Torbert, Chambersburg, a belt saw.

A few feet to the right of Machinery Hall, between it and the race course, a large bell was on exhibition, from the foundry of A. Fulton's Sons & Co. Its weight was 3,000 pounds, and on it was the inscription—"Presented by the ladies of North avenue M. E. church." It gave out a clear, loud, musical tone, and was considered by all who listened to it superior in sound to any bell in the twin cities.

IRON, STEEL, COPPER, MINERALS AND ACIDS.

Not one-tenth part of the manufacturers of this line in Pittsburg contributed to this display. A quantity of spring steel and cutlery was from Anderson, Cook & Co. A. H. Rowland, of the Rowland Spring Company, had on exhibition highly improved springs of all descriptions, several very heavy, made of one continuous plate of steel, without joints. Jones & Laughlin had their patent cold rolled machine shafting and finger bars; Nimick & Co., fifteen different brands of charcoal and bituminous coal, smelted pig iron, and Armstrong & Matthews, two barrels of coke free from sulphur; the Braddocks Field Gas Coal Company and the Eureka Oil Works exhibited lubricating and burning oils; J. Schoonmaker & Son, Allegheny city, white lead and paints ground in oil. Samples of lime were from S. Mackall and Shortridge & Co., Bellefonte, and specimens of coal from Armstrong & Co., Pittsburg. The Pennsylvania Salt Manufacturing Company exhibited bi-carbonate of soda, sal soda, sulphuric and muriatic acids.

LEATHER, SADDLERY, HARNESS, &C.

Only six or eight sides of leather were entered—very fair specimens and well tanned. Loughrey & Frew, Pittsburg, exhibited some fine silver-mounted double carriage harness; also light buggy and wagon harness, section hose, men and women's saddles and wagon whips. R. H. Hartley & Co. had the largest display of saddlery, trunks, whips, harness, &c., on the ground; also a lot of superior bridles. Hartley, M'Kee & Co., belting and patent hose. John Bell, trunks of sole leather, and Fred Korb, of Buchanan, a very fine round strap buggy harness. There was also an ingenious article to prevent horses from cribbing.

BUTTER, CHEESE AND HONEY.

Only sixty-five pounds of butter, fifty-five of which were entered by Ellen M'Cormick, of Remmington, and ten pounds by Mary M'Cullough, of Wilkensburg. Jacob Weaver exhibited the Ramsey Bee Hive. No cheese, and but one box of honey, medium quality. No flour or meal was entered.

GRAIN, SEEDS AND VEGETABLES.

J. Knox's collection of small seeds comprised extensive varieties put up in small bags; he also had a fine sample of the Goodrich seed potatoes. George A. Deitz, of Chambersburg, exhibited four varieties of wheat, namely: European, White, Red and Mediteranean White, also oats and rye; James W. Elliott, barley and flax seed; Geo. R. White, Wilkins P. O., white corn; E. V. Ashbridge, Chester county, yellow corn. A small quantity of the common sorts of vegetables was found, but nothing better than ordinary, save some enormous squashes, raised in the suburbs of Pittsburg, one of which weighed one hundred and ten pounds.

WINE, GRAPES, &C.

The collection of grapes was very large and varied, and of superior quality, among the varieties were the Syrian, Muscat, Black Hamburg, Cambridge, Concord, Botanic, Delaware, Catawba, Isabella, and the Hardy grape, a new variety. The principal competitor was J. Knox. J. Thompson, Sewickley; Jas. W. Elliott, Pittsburg; Robert Grierson, J. R. and A. Murdock, had also large numbers. Robert Douglas, of Chartiers township, Allegheny county, exhibited a large collection of native grapes. A few bunches of fine white Madeiras were in Floral Hall, but unnoticed by the committee.

The vinegar exhibited was excellent, comprising White Wine, Raspberry, Cider and Strawberry. H. W. Buffum, exhibited his bottled mineral waters; the California Wine Company some samples of wine made from the native California grape, at Los Angelos; Mrs. C. Dravo, Lawrenceville, currant wine; Eliza Wilson, Haysville, sorghum, rhubarb, tomato and elderberry wine; S. S. Crowther, of Monroeville, blackberry wine, and Pier, Dannals & Co., also Spencer & M'Kay, samples of ale. The latter firm exhibited a barrel of best stock ale.

FRUITS AND ORNAMENTAL TREES.

The extreme dryness of the season, and consequent general scarcity of fruit, may have occasioned the limited presentation. The quality was fair, and as good as could reasonably have been expected. Among the varieties of apples were Greenings, Rambos, Golden Sweetings, Seek-no-Furthers, and a few samples of the common winter apples; no Russetts. The best and largest collection was exhibited by John S. Smith, of Mt. Lebanon, Allegheny county, and the second best by James A. Nelson, of Indian Run, Mercer county. S. Nixon, of Woodville, and Mr. Nelson, the best varieties of fall apples. There were ten or twelve varieties of pears, including the Bartlett, Sickles and Vergalo. The Messrs. Murdock, of Pittsburg, presented the largest variety; and James Calder, of Harrisburg, extra fine Duchess d'Angonleme. The number of peaches was very small, but some of them very large in size; the best were from Messrs. Smith, of Mt. Lebanon, and Nelson, of Indian Run. A. Watring, of Buffalo, N. Y., exhibited the largest display. Fred. Seifer, of Indiana, Pa., received a special premium of $5 00, for German prunes. The Messrs. Murdock exhibited a variety of quinces; and J. Knox red and black raspberries.

Two handsome orange trees in bloom and in fruit, came from the hot house of E. M. Jenkins, of Pittsburg. The best general assortment of fruits was that of Mr. Nelson, of Indian Run. The Messrs. Elliott & Sons, of Pittsburg, exhibited a fine collection of fruit trees and vines. A large and fine collection of ornamental trees, comprising Evergreens of the Norway Spruce, Black Spruce, Austrian Pine, Scotch Pine, Arberdeen Cedar, American Hemlock and Cedars, Siberian Arber Vitæ; also the Juniper, Harts Leaf Spruce and Balsam Fir, by H. Bockstace & Son, of South Pittsburg, was a prominent feature in this department.

FLOWERS AND DESIGNS.

Floral Hall was well and tastefully filled. The contributors were Messrs. Elliott & Sons, J. R. and A. Murdock, Alfred Bennett and J. Knox, who exhibited some lovely hand boquets and baskets of cut flowers. From the green houses of the Messrs. Murdock were over two hundred varieties of dahlias. The collection of roses was small, but a great variety of verbenas, dianthas, zinneas, pertunias, heliotrope and geraniums, and among the latter class was the "General Grant," a new variety, exhibited by the Messrs. Murdock. The most numerous and elegant varieties of variegated leaved plants were furnished by Alfred Bennett, as were also the first premium bridal, round and hand boquets, and cut flowers.

STOVES, &C.

Pittsburg stove manufacturers did themselves much honor, and added materially in furnishing Domestic Hall. Graff, Hugus & Co., of Pittsburg, exhibited superior cooking ranges, ornamental parlor stoves, portable furnaces and an arrangement for setting grates; John B. Herron & Co., furnaces for public buildings and churches; Price & Sons, iron arbor seats and furniture; Roberts & Sherratt, ornamental parlor stoves; Anschutz & Son, ornamental grates for open fire; —— Anderson, of Rochester, Pa., a wood cooking stove, and J. J. Straight, of Rochester, N. Y., a fine cooking stove for wood or coal. Albert Hark, Jr., displayed willow ware, which was very creditable, but not strictly belonging to this class.

MANTLES, GLASS, CUTLERY, GAS LAMPS, &C.

Weyman & Bro., of Pittsburg, had on exhibition some beautiful slate marbleized mantles; Anderson, Boyd & Co., marble mantles and slabs, but W. W. Wallace exhibited the most elegant display of these articles, representing the richest of Carrara, Tuscan and American marbles. Roofing slate was entered by Thomas W. Parry, of Pittsburg. The silvered glass ware, comprising full table sets, ornaments for mantles and head-reflectors for locomotives, by Dethridge & Challoner, were of exquisite design and finish. This is a new invention, and promises to be a successful, as well as lucrative one. S. M. Kier made a fine display of jugs, fruit jars and white granite dinner sets. Wm. M'Cully & Co., of Pittsburg, and Edward Redman, of Birmingham, imitation Bohemian, and colored glass of various kinds, the latter exhibiting a model of the Pittsburg Female College in colored glass; Logan, Gregg & Co., a marble base fire stand; H. R. M'Clellan, wire-tied brooms; Weldon & Kelley, a number of kerosene and gas lamps; also, burners, and a spiral corrugated lamp chimney. Eradicating and toilet soaps, by Dr. Monroe, of Philadelphia, and by the Pennsylvania Manufacturing Company; Mrs. H. C. Davis, home-made soap; H. Collins, chimney top and pipe; S. P. Collins, of Pittsburg, clothes dryer; and Benton, Winchester & Co., washing powder.

TEXTILE FABRICS.

These were largely of foreign manufacture. While looking at the limited display, the handiwork of the mothers and daughters of our industrious State, we thought how times had changed since Washington's mother received her visitors with knitting in her hands, and a check apron on of her own spinning and weaving. How proud then was every matron of the products of her own busy fingers! Have we improved since then, or are the mothers and daughters of Pennsylvania taking a retrograde step?

Four of the leading carpet houses of Pittsburg contributed rich and various designs of fancy carpeting, rugs and other woven goods. Mrs. C. A. Morton, of Allegheny city, entered the only piece of rag carpeting; E. Hyde, of the same place, exhibited cotton yarns and batting; Ellen M'Cormick, of Remmington, Pa., double coverlets, woolen blankets, barred and plain flannels, plain linens and linen sheeting; A. H. Childs & Co., of Philadelphia, carpet chain and seamless grain bags; Mrs. T. Long, of Pittsburg, the best boys suit of clothing; Sallie A. Bargessor, of South Pittsburg, a bed quilt; Mrs. Anderson, of Baden, Beaver county, two quilts; Mrs. C.

A. Morton, of Allegheny city, woolen stockings, socks and mittens, also, a shirt made by hand, of very fine texture; Miss N. Gallinger, of Allegheny, a fine bed quilt, embroidered shawl, worked and embroidered slippers, and shirts made by hand; Mrs. Mary A. Johnson, chenille work and embroidery; also shirts; Ellen M'Cormick, of Remmington, a double coverlet and fancy quilt; also, needle-work in canvass; Sophia Feltwell, Lawrenceville, muslin quilt and hand-made mat; Mary Quinlan, Pittsburg, a variety of bead work and knit bureau cover; Lydia E. Markle, Lawrenceville, rug; E. and M. Barr, Allegheny city, embroidery; Elizabeth Griffith, Brownstown, Pa., fancy calico quilt; Miss E. M. King, of Lancaster, silk quilt, and Miss Sedenburg, of Harrisburg, pianó cover. A large share of these articles were soiled and badly disfigured by the dust.

KNITTING, CROCHET AND SHELL WORK.

There were only six entries in this class who competed for premiums. Mary Quinlan, Pittsburg, exhibited a knit shawl, cotton tidy, crochet slippers and mats; Mrs. Mary Mullen, Philadelphia, best zephyr shawl; E. Able, of Pittsburg, artificial flowers; Sarah Riddle, of the same city, burr-work, hair-work and wax flowers; Mrs. John Mitchell, of Sewickly, also a fine display of hair-work. There were only two small pieces of burr-work on exhibition, one by Miss Riddle, and the other by Miss Eliza Wilton, of Hareville, Pa.

BREAD, CAKE, PASTRY, &C.

Very large and tempting displays under this head were entered, but unfortunately for our report, were to be eaten without examination. In Domestic Hall, one solitary loaf of bread and one of cake were found, but without cards attached. Two very fine hams, with recipe for curing, were entered by Randall Morton, of Pittsburg, who received $8 premium. This class proved a total failure.

PRESERVES AND JELLIES.

These were prepared with such care, nicety and profusion, that the committee found great difficulty in detecting differences. Mrs. C. A. Morton, of Allegheny city, the largest contributor, displayed preserved peaches and pears, spiced fruits, canned fruits, apple, pear and peach jellies and pickles; Mrs. C. Dravo, of Lawrenceville, plum and other jellies, apple butter, canned vegetables, quinces and strawberries, spiced fruit and pickles in variety; Mrs. Wilton, of Haysville, preserved quinces and jelly; Mrs. James Swett, currant jelly, and Mrs. M'Cully, of Pittsburg, a fine display of canned fruits.

THE FINE ARTS.

The specimens of Penmanship from the different Commercial colleges, were elaborately executed and very handsome. The only specimen made by schools, was that of Charles A. Dunbar, principal of the Mansfield Valley Normal School. Alexander Cowley, of Smith & Cowley's Commercial College, exhibited some 300 specimens, executed by himself and pupils. There was also an entry by B. M. Glenn, which was not to be found. Photographs were in greater variety and excellence than often met with at agricultural exhibitions. Cargo exhibited many colored photographs in oil, admirably executed, among which was a boy clad in Highland costume, and an admirable photograph of the Prince of Wales. W. H. Whitehead exhibited a large number of photographs in oil and water colors. B. L. H. Dabbs, photographs and colored crayons. S. J. Osborne's "Laughing Bevy," and a half size child's portrait were extra good. Of oil paintings there were very few. Geo. B. Jonson, of Allegheny city, a boy 15 years old, exhibited a collection of oil paintings on canvas and wood, of considerable merit, his group of birds being very life like and natural. Alexander Harley exhibited an oil painting of Kittanning Point, P. R. R., a very truthful creation of the brush, and John M. Ridley a very excellent fruit piece. Some beautiful specimens of wood graining, oak, walnut and rosewood, bore the name of Samuel L. Lambert. D. B. Morris, a specimen of stucco work. Three very pretty models were also on exhibition, one of a full rigged schooner, by William Walton; one of a ship in full sail, by John Shaw, and the third, a beautiful miniature model of the Duquesne steam engine, in wood. W. W. Wallace exhibited a marble infant in a reclining posture, also a bust of Shakespeare, cut by himself when only fourteen years of age. There was also a model of the proposed monument to Mr. Lincoln. In a glass case resting on the opposite dais of the monument or pyramid raised in the centre of Fine Art Hall, was the skeleton of a horse's head, curiously dissected and prepared by a veterinary surgeon, the different parts of the skull being named. Seyman and Bros. displayed a beautifal glass sign, and W. W. Wallace a marble monument, a very chaste and beautiful design. P. C. Reniers, sculptor, of Pittsburg, exhibited a beautiful cross of Canara marble, entwined with curiously wrought flowers and leaves, for which he was awarded a premium. Messrs. Boyd, Murray and Faucett exhibited landscape chromo lithographs, beautifully framed and finished.

MERCANTILE DISPLAYS.

James Robb made a fine exhibition of boots and shoes; Fin, Mains & Co., hats, caps and furs; Beckham & Long, bells; Herman Schulte, display of fire-arms; M. A. Evans & Co., general mercantile display; Roberts & Sherratt, grocers, cannisters; A. Dary, feather fans; W. E. Sterin, mathematical instruments; and G. R. Slater & Co., washing fluid.

SILVERWARE, SEWING MACHINES, &C.

Six of the popular kinds of sewing machines were on trial, which the committee classed in order of their merit as follows: Weed, Wheeler & Wilson, Empire, Wilcox & Gibbs, Grover & Baker and Florence. Rich and expensive sets of silver and plated ware were from J. B. M'Fadden & Co., also Reed & Co. The only piano on exhibition was one from the Central Piano Manufacturing Company, which occupied a quiet corner and was little noticed, though a very fair instrument.

BEET SUGAR MACHINERY, SORGHUM MOLASSES, SUGAR CROPS.

The Buffalo Agricultural and Machine Works exhibited an excellent sorghum mill and evaporator, and a vertical sorghum mill, evaporator without rocker, and a bargess carriage. There were no specimens of sorghum either on manufacture or exhibition.

MISCELLANEOUS ENTRIES.

Here were included all sorts of new models and patents of inventors, besides many other articles. The *Daily Commercial*, of Pittsburg, exhibited a small steam engine, which was kept running during the fair, connected with a press, which was kept running every day for the distribution of circulars to exhibitors and to the public. Cast iron gas and steam pipes were exhibited by Wm. Smith, of the National Pipe Works, Pittsburg; Hendershott's gang lathe mill, by Henry Fenton, Pittsburg; leeches, by George Faulker; petroleum cooking stove and fixtures, Roberts & Sherratt, Pittsburg; patent safety bridle and rein, D. M. Donnaho, Beaver, Pa.; combined safe, dumb waiter and bread cutter, J. Weaver, Jr., Pittsburg; wood tubing, Woodward & Farrington, Williamsport, Pa.; glass show cases and mirrors, C. J. Young & Co., Pittsburg; cottage and house mill, J. Sedgber, Painesville, O.; knitting machine, Jas. D. Orne, Rochester, N. Y.; model shutter fastener, Price & Sims, Pittsburg, Pa.; Atlantic job printing press, Fry, Hacket & Wheeler, Pittsburg; plumbing work, Bailey, Farrell & Co., Pittsburg; Shingles, A. B. Lang & Sons, Osceola Mills; strawberry crate, baskets and step ladders, J. Knox, Pittsburg; patent hub borer, Harpet, Gutman & Co., Allegheny; corn and garden hoe, horse-radish grater, and harness snaps, John S. Hall, Pittsburg; spoke shave, S. S. Fleming; lithography, Krebs & Bro.; patent photographic baths, A. Cobbs; concentrated lye and allum, Penn Salt Manufacturing Company, Natrona; spring-water ice, A. J. Rich, Wilkinsburg; sewer pipe and hydraulic cement, R. B. and C. H. Brockett, Allegheny city, Pa.; patent slate surface, T. G. Reineman, Philadelphia; lubricating oil, Volcanic Coal Oil Company, Philadelphia; bolt and rivet cutter, J. H. Sheltar, Philadelphia; grindstones, A. R. Hunt, agent, Philadelphia; self-setting animal trap, J. Weaver, Pittsburg; Keystone farm gate, P. L. & R. Miller, Mechanicsburg; bottle corking machine, John Resick, Pittsburg; skeleton of horse's head, and horse and cattle powder, John Birch, Pittsburg; patent paint, D. E. Longsdorf, Mechanicsburg; ornamental castings, Livingston & Co., Pittsburg; bird cage, C. Klinefelter; lithography, A. Hani; patent market box, F. Gearing; woolen knitting machine, S. M'Cartney, Indiana, Pa.; portable fan for smiths' forges, J. H. Skelton; bag holder, Jacob Weaver, Jr.; spiral pen rack, James Adams; ammoniated super-phosphate of lime, Stewart & Campbell, Pittsburg; model of self-adjusting steam piston packing and pew hat rack, E. S. Blake; patent fire brick, John Miller & Son, Sandy Ridge; picture and looking glass frames, Boyd, Murray & Fawcett; butter cooler, Wm. Gurrand, M. D., Fallston, Beaver county, refrigerator, W. W. Bradshaw; farm gate, D. F. Luce, Spring Mills, Pa.; Congress puff cigar, S. Spreck, Bedford; suction and force measuring faucett, Enterprise Manufacturing Company, Philadelphia; chimney ventilator and spark arrester, John Snively, Williamsburg, Beaver county; model railroad chair, J. S. Mepham, E. Liberty; American eagle, John M. Straub, Troy Hill; parrots, John Snyder, Pittsburg; mill bush, Frank Lud, Harrisburg, Pa.; railroad lever jack, Dr. Kindleberger, Cincinnati, O.; Buckeye farm gate, William Snyder, Wooster, O.; barometer, H. and A. N. Kennedy, Allegheny. These and a variety of small articles comprised the class of miscellaneous entries.

The patent fire extinguisher was tested on Thursday afternoon on a build-12 feet square and 10 feet high. The doors and windows were open to admit of draft, and the building was soaked in petroleum and filled with combustible matter, then set-on fire, and when in a full blaze, four extinguishers were put on, and in less than three minutes the fire of the burning building was completely extinguished, and the building simply sorched. It was tested fully to the satisfaction of the officers of the fair, the committee and the public.

Side-shows were numerous without the entrance of the grounds. Inside were the famous Siamese twins, who added much to the interest, their tent being crowded with the curious each day. Nellis, the man without arms, was also on exhibition inside the park, and received a share of the patronage. Professor Flander, the bee man, attracted the crowd as easily as he did his bees, a swarm of which he carried in a conical cap which he wore on his head, who buzzed thickly all about his head and ears, while he delivered his humorous address upon their character and habits, and his method of training them, and while thus engaged he would industriously dispose of his little pamphlet, entitled "Nature's Bee Book," and "Sweet Leve," a a bottled preparation for taming bees.

A large force of police were in attendance day and night, who were vigilant and efficient, and justly deserved the thanks of the society and the public.

The refreshment stand did a large business, and although much lager was imbibed, it was noticeable that very few persons were intoxicated. No spirituous liquors were allowed within the enclosure, and this no doubt contributed largely to the general order and quiet.

The attendance on the first day was some 6,000; on Wednesday, 12,000; on Thursday, from 25,000 to 30,000, and on the fourth and last day, 20,000; making a total of about 68,000 visitors.

The Great Western band discoursed excellent music during the entire exhibition, not only to the satisfaction of the society but to the public.

Agriculturally speaking the fair was not a success, although it was financially, and so far as the display may be considered an exposition of the resources or industry of the great State of Pennsylvania, it was a partial failure. The weather was fine throughout the week, but the immense clouds of dust which hovered over the grounds proved very annoying. The managers tried to allay this dust by the use of sprinkling carts. People, however, bore it good humoredly, and those whose appetite demanded beer and other fluids as a corrective, largely patronized the numerous saloons. The officers of the society availed themselves of every means in their power to furnish exhibitors plenty of room, and ample time was given for making entries, as the time of closing was extended throughout the second day. Every department was complete in its arrangements, but exhibitors were wanting. The blame rests entirely on the local manufacturers and producers who did not turn out as they should have done. Philadelphia was barely represented, and outside States aided but very little. The officers of the society deserve the thanks of the public for their endeavors to make the fair a perfect success, but the people of Pennsylvania are much to blame for their failure in exhibiting the products of the State.

PREMIUMS AWARDED

At the Exhibition at Harrisburg, 1869.

CLASS NO. 1.—IMPORTED CATTLE AND THOROUGHBRED HERDS.

To John Benson, Colebrook, for best herd of Durhams	$50 00
To William Colder, Harrisburg, best herd of Durhams, owned and bred by exhibitor..	50 00
To A. Wilhelm, Cornwall, best herd of Holsteins..............	50 00
To John Merryman, Cockeysville, Md., best herd of Herefords..	50 00
To John Benson, Colebrook, best herd of Devons..............	50 00
To A. Wilhelm, Cornwall, best herd of Jersey Alderneys	50 00
To William Colder, Harrisburg, best herd of Brittany Alderneys,	50 00
To John Benson, Colebrook, best imported Guernsey Alderney bull	30 00
To John Benson, Colebrook, best imported Guernsey Alderney heifer..	20 00

CLASS NO. 2.—DURHAM (SHORT) AND DEVON CATTLE.

To Martin Early, Palmyra, for best Durham bull, three years old, first premium of..	$30 00
John Casey, Harrisburg, for Durham heifer, one and a half years old, the second premium of............................	5 00
Martin Early, Palmyra, for best bull calf, fourteen months old, the first premium of..	15 00
Martin Early, for Durham bull calf, six weeks old, the second premium of..	5 00
Martin Early, for Durham heifer calf, two and a half months old, the second premium of..................................	3 00
John Benson, Colebrook, for Durham bull, Grand Bashaw, eight years old, second premium of............................	8 00
John Benson, Durham bull calf, Colebrook, six months old, the first premium of..	8 00
John Benson, for calf, Fawn, six months old, the first premium of	5 00
John Benson, for heifer, Maid, second premium of.............	10 00
John Benson, for Devon bull, Norfolk, seven years old, the first premium of..	30 00

John Benson, for Devon heifer, Rose, three years old, the first premium of	$10 00
John Benson, for Devon heifer, Juliet, two and a half years old, the second premium of	10 00
John Benson, for Devon heifer, Dahlia, two and a half years old, the first premium of	15 00
William Colder, Harrisburg, for Durham cow, Sue, three years old, the second premium of	10 00
John Benson, Colebrook, for Devon heifer, Victoria, one year old, the first premium of	5 00
John Benson, for Durham heifer, Berry, one and a half years old, the first premium of	10 00
Philip Oldwiler, Elizabethtown, Lancaster county, for two Durham cows, (superior animals,) (approved by Executive Committee,) a special premium of	10 00
Martin Early, Palmyra, for Durham cow, Beauty, four years old, the first premium of	20 00
Martin Early, for Durham cow, Princess, two and a half years old, the first premium of	15 00

Class No. 3.—Alderney, Ayreshire, Holstein and all other Cattle not in Nos. 1 and 2.

To John Merryman, Cockeysville, Md., for Hereford bull, Marion, six years old, the first premium of	$30 00
John Merryman, for bull, Frederick, one year old, the first premium of	5 00
John Merryman, for Hereford cow, Cora, fourteen years old, second premium of	10 00
John Merryman, for Hereford heifer, Meg. Merriles, three years old, the first premium of	15 00
John Merryman, for heifer, Corrinne, one year old, the second premium of	5 00
John Merryman, for calf, Queen, the first premium of	3 00
A. Wilhelm, (Cornwall estate,) for the Holstein or Dutch Belted bull, Frederick the Great, the first premium of	30 00
A. Wilhelm, for the Holstein or Dutch belted cow, Princess Alice, the first premium of	10 00
A. Wilhelm, for heifer, Duchess, the second premium of	5 00
A. Wilhelm, for heifer, Kathleen, the second premium of	5 00
A. Wilhelm, for the heifer, Elsie, first premium	10 00
A. Wilhelm, for heifer, Henrietta, the second premium	5 00

A. Wilhelm, the heifer, Fanny, first premium	$10 00
D. W. Gross, Harrisburg, for Jersey cow, Lena, the first premium of	10 00
D. W. Gross, for heifer calf, Amy, three months old, the second premium of	3 00
L. W. Ott, Susquehanna, for Alderney bull, Paxton, twenty months old, the first premium of	10 00
William Colder, Harrisburg, for Alderney cow, Elsie, the first premium of	20 00
William Colder, for Alderney heifer, Nora, over one year old, the first premium of	10 00
William Colder, for heifer, Gift, the second premium of	5 00
William Colder, for Ayreshire heifer, Bluecap, the first premium of	20 00
William Colder, for Alderney cow, Frosty, three years old, the second premium.	
William Colder, for his Alderney bull, Simon, over three years old, the first premium of	30 00
William Colder, for Alderney bull, Highflyer, the second premium of	15 00
William Colder, for Alderney bull, Mountain Boy, over three years old, the first premium.	
William Colder, for Alderney cow, Jane, the first premium.	
Amos E. Kapp, Northumberland, for Alderney heifer, Jenny Lind, six months old, the first premium of	3 00
Amos E. Kapp, for Alderney bull, Hope, under two months old, the first premium of	10 00
Amos E. Kapp, for heifer, Bessie, one year old, the first premium of	10 00
Amos E. Kapp, for Alderney cow, Fanny, four years old, the committee recommended a reward of twenty dollars, as the animal is highly meritorious.	
William Colder and A. E. Kapp, for Hereford heifer, Katy, two years old, the first premium of	15 00

CLASS NO. 4.—HERDS, WORKING OXEN AND FAT CATTLE.

To A. Wilhelm, (Cornwall estate,) for one yoke of Holstein or Dutch belted oxen, one year old, the first premium of	$15 00
John Merryman, Cockeysville, Md., one fat steer, (Hereford,) the premium of	10 00
William Colder, of Harrisburg, for display of cattle, (fifteen in number,) owned and held as farm stock, a premium of	40 00

Class No. 5.—Native and Grade Cows.

To Samuel Fiske, superintendent of Harrisburg cotton mill, for grade Alderney cow, the first premium of	$10 00
J. E. Fisler, Harrisburg, for native or grade cow, the first premium of	10 00
David Gardner, Cumberland county, for one grade cow, Alderney and Devon, the first premium of	10 00
C. P. Steinmetz, Annville, Lebanon county, for a grade heifer, two months old, the first premium of	5 00
C. P. Steinmetz, for a Durham grade cow, four years old, the first premium of	10 00

Class No. 6.—Imported and Thoroughbred Horses.

To Elbridge M'Conkey, Harrisburg, for the thoroughbred stallion, Vidette, seven years old, the first premium of	$40 00
William K. Wilson, Highspire, for thoroughbred stallion, Dixie, three years old, the first premium of	25 00
J. D. Cameron and William Colder, Harrisburg, for imported stallion, Prince Imperial, the first premium of	50 00

[The Committee on Imported and Thoroughbred Horses, report: That they have examined all horses presented under these classifications, and have awarded the first premium for imported horses to the Percheron stallion Prince Imperial, entered by J. D. Cameron and William Colder. We also unanimously award the first premium of forty dollars to the thoroughbred stallion, Vidette, over four years old, entered by Major Elbridge M'Conkey. This horse we regard as a very superior animal. His pedigree, which is perfect in every respect, shows his descent from the most celebrated stock, while his appearance is such as to commend him to persons desiring to breed the highest type of horses, or first class roadsters. We have also examined the stallion, Dixie, three years old, entered by W. K. Wilson, and award him the premium of twenty-five dollars.]

Class No. 7.—Trotting Horses, Mares and Geldings.

To Miss Mary Ott, Susquehanna township, for child's pony, Prince, a premium of	$5 00
J. R. Odikirk, Freehold, New Jersey, for bay gelding, (entered in Division No. 2,) the first premium of	100 00
John Lovett, Philadelphia, for his gray stallion, Ironsides, (entered in Division No. 2,) second premium of	50 00

Philip Linn, Harrisburg, gray gelding, Sassarack, (entered in Division No. 2,) third premium of	$25 00
J. R. Odikirk, Freehold, N. J., for bay gelding, (Division No. 3,) the first premium of	75 00
Philip Linn, Harrisburg, (Division No. 3,) for the gray gelding, Sassarack, the second premium of	15 00
Charles Boas, Harrisburg, for bay gelding, Butcher Boy, (Division No. 3,) the third premium of	15 00
Joseph Montgomery, Harrisburg, for bay stallion, Dauphin, four years old, (Division No. 4,) the first premium of	50 00
J. Dunlap, Lykens, for bay horse, Bill, four years old, (Division No. 4,) the second premium of	30 00
Crawford & Hughes, Harrisburg, for sorrel gelding, Rattler, in pacing purse, (Division No. 5,) the first premium of	40 00
P. E. Linn, Harrisburg, for gray mare, Kate, (Division No. 5,) a premium of	5 00

SPECIAL PREMIUMS.

To the dark bay horse, Patchen Chief, (Time—1st heat, 2:40; 2d heat, 2:36½; 3d heat, 2:37½,) a special premium of	$250 00
To the gray horse, Ironsides, (second best,) a special premium of	100 00
To the bay gelding, no name, (third best,) the third premium of	50 00

CLASS NO. 8—MATCHED HORSES.

To Dr. P. M. Swinehart, Palmyra, for his horse, harness, the second premium of	$5 00
William Stephens, Harrisburg, sorrel mare, gaited, the second premium	5 00
Jacob Lemon, Patterson, Pa., for his pair of heavy draught horses, the first premium	20 00
S. W. Sharpe, Newville, Cumberland county, for his riding and driving horse, the first premium	15 00
H. C. Trump, Jersey Shore, for a pair of horses of one color, the second premium	10 00
Philip Linn, Harrisburg, for his gelding for harness, the first premium	15 00
Dr. J. Stickel, Cumberland county, for his family mare, the first premium	15 00
W. W. Bair, for one pair trotting horses, ("Johnny Trouble" and mate,) a premium of	30 00

CLASS NO. 9.—STALLIONS AND MARES FOR ALL WORK.

To Martin Early, Palmyra, for black mare, 3 years old, the second premium of	$5 00
James Reed, Dauphin, for yearling colt, the second premium of	3 00
James Reed, Dauphin, for black mare, 4 years old, the second premium of	5 00
James Reed, Dauphin, for a pair of sucking colts, (twins,) the second premium of	20 00
James Reed, Dauphin, for his stallion "Clifton," 4 years old, a premium of	5 00
George Kinter, Dauphin, for his "Chester Lion," quick draught, over 6 years, the first premium of	30 00
John H. Harper, Harrisburg, for heavy draught mare, (French Norman,) 6 years old, first premium of	15 00
A. Wilhelm, (for the Cornwall estate,) for the bay mare and colt, "Lady Bell," the first premium of	25 00
A. Wilhelm, (for Cornwall estate,) for the sorrel mare, "Pochahontas," 3 years old, a special premium of	20 00
A. Wilhelm, (for Cornwall estate,) for young bay horse, "Dexter," the first premium of	15 00
General John F. Hartranft, Norristown, Pa., for his bay stallion, "Montgomery," quick draught, 5 years old, the first premium of	20 00
Peter Cocklin, Cumberland county, for his bay stallion, "Boston Morgan," quick draught, 7 years old, the second premium of	10 00
Daniel B. Musser, Eberly's Mills, Cumberland county, for a yearling mare colt, the first premium of	16 00
Samuel W. Sharp, Newville, for stallion, for quick draught, the second premium of	10 00
Gilson Eakin, Saltsburg, Indiana county, for his Leicester stallion, heavy draught, 5 years old, the second premium of	20 00
Gilson Eakin, Saltsburg, Indiana county, for his stallion "Canadian Chief," 8 years old, quick draught, the second premium of	25 00
Gilson Eakin, Saltsburg, Indiana county, for his colt, heavy draught, 2 years old, the first premium of	10 00
C. Hoover, Harrisburg, for his colt, 16 months old, the first premium of	10 00
Philip Oldwiler, Elizabethtown, for a draught horse, the first premium of	10 00
W. S. Anderson, Dillsburg, York county, for his mare "Betsy Baker," for quick draught, 8 years old, the second premium of	10 00
W. S. Anderson, Dillsburg, York county, for a gelding 3 years old, the second premium of	15 00

Class 10.—Jacks and Mules.

To Daniel S. Early, Hummelstown, for one pair of mules, the second premium of	$10 00
Henry Gross, Middletown, for imported jack, (very extra,) 3 years old, the first premium of	25 00
Henry Gross, for his jenny, the first premium of $10, and the second premium of $5	15 00
John Wogan, York, for one six-mule team, a premium of	15 00
Eli Kendig, York, for pair of mules, the first premium of	15 00
J. D. Cameron, Harrisburg, for a six-mule team, the first premium of	30 00
Richard Fox, Hummelstown, for his imported jack, "Warrior," the first premium of	20 00

Class 11.—Flocks and Fleeces.

To Joshua Wright, Washington, Pennsylvania, fleece of wool, one shearing from one sheep, Saxony Merino, first premium of	$10 00
A. Sharp Woodburn, Cumberland county, a pen of nine ewes, three over 1 year, and under 2 years, and three lambs, the premium of	20 00

The Executive Committee recommend a *special* premium of ten dollars to G. A. Deitz, of Chambersburg, for his show of Angora soft-wooled goats, and ask the committee to report accordingly.

Class No. 12.—Imported and Thoroughbred Sheep.

To J. D. Cameron, Harrisburg, for Southdown buck, under two years old, first premium of	$10 00
J. D. Cameron, for Southdown buck, over two years old, first premium of	15 00

Class No. 13.—Swine.

To E. B. Ashbridge, Willistown, Chester, Pa., for best herd of swine under six months old, a premium of	$15 00
E. B. Ashbridge, best boar, over one year old and under two, a premium of	10 00
Henry P. Jones, Cherry Tree post-office, for second best boar, "Heenan," a premium of	5 00
E. B. Ashbridge, for second best boar	3 00

George A. Deitz, experimental farm, Chambersburg, for best breeding sow, over one year, a premium of	$10 00
Philip Oldwiler, Elizabethtown, Lancaster county, one sow, under one year old, a premium of	5 00
E. B. Ashland, for best lot of five pigs, a premium of	10 00

Class No. 14.—Poultry.

For the best trio of any breed, over one year old, to Dr. J. D. Bowman, Camp Hill, Pa., for one trio game, first premium	$5 00
For the second best trio of any breed, over one year old, D. W. Gross, Harrisburg, for one trio light Brahmas, second premium	3 00
For the best pair of Domestic turkeys, Geo. Boyer, for one pair of bronze turkeys, first premium	2 00
For the best pair of geese, W. S. Sadler, Camp Hill, Pa., for one pair of China (so-called) geese, first premium	3 00
For the best pair of ducks, J. B. Nisley, Middletown, for one pair of white ducks, first premium	3 00

Class No. 15.—Plows and Plowing.

L. H. Lee, Harrisburg, for Doty's Franklin convex plow, the first premium of	$5 00
Parsons & Finney, Harrisburg, for one steel sub-soil plow, the first premium of	5 00
John Kelsey, Yardleyville, Bucks county, best harrow, a premium of	5 00
Remington Agricultural Works, Illion, N. Y., for best one-horse plow	5 00
(Also, honorable mention of remaining plows in the lot on exhibition.)	
Abram Bates, Susquehanna township, Dauphin county, for best plowing, (with Hall & Spear's No. 4 steel plow,) a	Silver medal.

Class No. 16.—Reaping and Mowing Machines.

There being no premiums awarded to exhibitors in this class, we herewith append the report of the committee:

State Fair Grounds,
September 30, 1869.

Mr. President:—We, the Committee No. 16, have the honor to report: The number of mowing, reaping and combined machines exhibited was *very* large and creditable, and the rivalry of inventors and manufacturers have introduced a fine series of well made machines, the relative merits of which must be determined by practical application in the field.

This rivalry has furnished, to the farmer, machines of excellent material, substantial workmanship, artistic finish and completeness, together with much simplicity of construction.

The machines divide themselves into two classes—the one-wheeled and two wheeled. The majority of the machines presented for examination were of the latter class.

Great efforts were made on the part of the manufacturers of the several machines examined to produce lightness and insure directness of draught; to obviate the effects of a concentrated shock; to substitute steel, wrought and malleable iron for castings; to relieve the pressure upon the horses' necks while operating; the elevating and depressing of the cutter-bar while upon the *road;* the variety and ingenuity shown in the self-rakers and droppers, the adjustable fast and slow attained by some; the variety of journals for the attachment of the Pitman were usually identical with the machine, and in all the machines analagous principles were applied by the use of very different apparatus.

In the opinion of your committee, the two-wheeled machines present the following advantages: 1st. The *power* attained by two "drivers." 2d. Becomes a *true* carriage when upon the road. 3d. Is capable of holding and carrying the requisite machinery without the liability to *jar.* 4th. More *regularity* of motion. 5th. Presents a fulcrum in its "driver's" axle for the operator to counterbalance the weight of the tongue, and to elevate and depress the cutter-bar.

Several "patent" reaper-knives were examined, and considerable ingeniousness displayed in their adaptability.

The following is a list of the awards recommended:

The Dodge—Honorable mention of combined two-wheeled machine.

The Champion—Honorable mention of the single mower two-wheeled machine.

The Buckeye—Honorable mention for durability in practice; two-wheeled.

Mr. C. B. Woglemuth—Honorable mention for many good qualities, fine finish and workmanship; two-wheeled machine.

The New Yorker—Honorable mention of self-rake adjustment and a one-wheeled machine.

The Clipper—Honorable mention of mower for lightness.

The Kirby—Honorable mention as a single-wheel reaper.

D. H. Nash, N. Y.—Honorable mention for lightness of draught and simplicity; one horse.

Patent reaper sickle and reaper knives—diploma.

Hoping this may meet your own and the Executive Committee's approval,

We are yours, &c.,

S. S. HALDEMAN, *Chairman*,
HUGH HAMILTON,
W. F. EYSTER,
Committee.

Class No. 17.—Threshing Machines and Horse Powers.

The Committee make honorable mention of the following entries:

Eberly, Lutz & Baker, Lancaster county, for threshing machine model—special mention.

Daniel Kauffman, Boiling Springs, Cumberland county, for combined threshing machine and fodder cutter—diploma.

D. T. Wilson, Harrisburg, for corn stalk cutter, hay and straw cutter, and hay, straw and corn stalk cutter—special mention.

Pasons & Finney, Harrisburg, for one Dexter hay cutting-box, as a hand machine—special mention.

William L. Boyer & Bro., Philadelphia, one improved straw-preserving champion thresher. For the manner in which the straw is delivered, special mention.

Geyser Manufacturing Company, Waynesboro', Franklin county, for one triple-geared horse power, (best,) and one Geyser separator, cleaner and bagger, honorable mention.

Parsons & Finney, Harrisburg, one two-horse railway power. A well made and easy running power, honorable mention.

Francis Buckwalter & Co., Montgomery county, Pa., for a one-horse railway power. A very simple, convenient and well made machine, honorable mention.

M. A. Keller, Adams county, Pa., for one patent threshing machine, favorable mention.

Clark & Carter, Springfield, Ohio, for one Barcalow grain separator, honorable mention.

Parsons & Finney, Harrisburg, for two Reynold's fanning mills, two family corn shellers, and power corn sheller, favorable mention.

John Ross, Centre Hall, Pa., one corn sheller and cleaner (power.) A very superior machine, having the advantage of an excellent fan. All easily worked, favorable mention.

Slifer, Hall & Shriner, Lewisburg, Pa., for two Buckeye corn shellers, (hand machines,) performing excellently, favorable mention.

Haberling & Co., for a tornado, vegetable and root cutter. Very superior, favorable mention.

Parsons & Finney, Harrisburg, American meat choppers Nos. 1, 2, 3 and 4, favorable mention.

P. K. Detrick & Co., Albany, N. Y., for a hay press and models, honorable mention.

F. Weaver, Harrisburg, one cottage corn sheller. A very convenient and expeditious sheller, favorable mention.

John H. Bear, York, Pa., for model of a burr vertical chopping machine, honorable mention.

All of which is submitted.

F. G. TIBBETS,
W. H. DAVIDSON,
BENJAMIN LESLIE,
Committee.

CLASS NO. 18.—CIDER MILLS, CHURNS AND ARTICLES OF SIMILAR CHARACTER.

The Committee on Class 18, awarding no premiums or diplomas, make the following recommendations and honorable mention:

To the President of the State Agricultural Society:

SIR:—Your committee having made a full examination of all articles on exhibition under Class No. 18, beg leave to make the following report:

We would recommend J. Wallace Scott's combined suction force pump as the best article of the kind on the ground.

Parsons & Finney exhibit one "Ganthrop" hydraulic ram, which we recommend as a very superior article.

Daniel Wilson exhibits (in our opinion) the best cider mill on the ground.

W. O. Hickok & Son, one very good cider mill.

Parsons & Finney, one Novelty portable cider mill, which we consider worthy of special notice.

Keeler & Sheffer, Lancaster, one large crusher cider mill, well worthy of special notice.

Parsons & Finney, one Worrall lift and force pump of very superior ability—we think the best on exhibition.

D. K. Overhiser, Williamsport, one adjustable air churn dash, which is well worthy the notice of farmers and dairymen—an excellent article.

Parsons & Finney, three Spain patent churns, worthy of special notice.

Barrows, Savery & Co., one of Prindle's patent agricultural steam boilers, an article which, in our opinion, ought to be on every farm in the land.

All of which is respectfully submitted.

JOHN P. RUTHERFORD,
PETER REED,
C. LONG,
H. B. HOFFMAN,
Committee.

CLASS NO. 19.—CULTIVATORS, GRAIN DRILLS AND SOWERS.

The committee in reporting the merits and demerits of the implements coming under our inspection, were in a quandary to decide which were the best—all seem as if they could do as much as is claimed by the exhibitors; but an actual test is the only method by which we could come to any just decision, which we, unfortunately, were deprived of.

We divide our field into three classes, viz: drills, cultivators, clover hullers and separators. The latest improvement in drills appears to be the combination of grain, phosphate and seed sowers. Among the many drills on exhibition, the single grain sowers all possess many good qualities that especially recommend themselves to particular persons in different localities. The class of forced-feed drills claim more regularity of distribution of grain, particularly those of Erisman & Bundle, of Lancaster, and Osborne, Foster & Co. It seems impossible for them to clog by any foreign matter that may be in the seed.

Bickford & Huffman's drill fills a place not occupied by any other in its ability to sow all kinds of seeds, the largest pumpkin seed as well as the smallest garden seed.

The drill exhibited by Cronell & Davison possesses the advantage of having a lever by which the driver on the drill can operate the shovels. This is a combined grain and phosphate sower.

The Willoughby spring seems to be gaining popularity from the fact of its being attached to many drills on exhibition.

Among the many combined seed and fertilizing drills, your committee would especially recommend for honorable mention, subject to the decision of the Executive Committee, the drill exhibited by William H. Hamilton, of Odessa, Delaware; is well adapted to move its gauge for regulating the quantity to be sown.

Among the field and corn cultivators upon the ground, your committee recommend especial attention to the one exhibited by Ford & Howe.

Among corn planters, we recommend the one exhibited by D. F. Lusse, of Springfield, Centre county, as possessing more points of superiority than any other.

Among cultivators and agricultural implements, the largest exhibitors were the Pennsylvania Agricultural Works, and Parsons & Finney, to whom the committee recommend an honorable mention.

The clover hullers on exhibition are very different in construction—all claim a superiority. A buckwheat huller exhibited by A. Crawford, upon trial, does all that is claimed.

Very respectfully,

W. J. WALLACE,
GEO. HILBISH,
FRANCIS F. ROWLAND,
HARVEY BRACKBILL,
Committee.

CLASS 20.—WAGONS, CARTS, DRAYS AND CARRIAGES.

A. B. Landis, Mount Joy, Lancaster county, for one six-seated two-horse family carriage, a	Bronze medal.
A. B. Landis, for light trotting wagon, a	Bronze medal.
Parsons & Finney, Harrisburg, wagon jack, premium of	$2 00
Parsons & Finney, carriages for children	2 00
F. Seidle, Mechanicsburg, for five bundles carriage spokes, a	Diploma.
W. W. Boyer, Harrisburg, for one top buggy	$5 00
W. W. Boyer, for one express wagon, a premium of	3 00
J. D. Cameron, Harrisburg, for best farm wagon, the first premium of	10 00
Ehrgott & Parks, Pittsburg, for hollow steel axles	Diploma.
A. W. Allsback, Scotch Hill, Clarion county, Pennsylvania, one lifting jack, a	Diploma.
C. F. Neff, York, Pennsylvania, for a sleigh, a premium of	$5 00
Citizen Fire Engine Company of Harrisburg, hose carriage, a	Bronze medal.

CLASS 21.—MISCELLANEOUS FARM TOOLS.

To P. Dill & Co., Cumberland county, Pennsylvania, for best grain cradle, a premium of	$2 00
Parsons & Finney, Harrisburg, for best scythe and snathe, a premium of	2 00
Parsons & Finney, for best six grass scythes, a premium of	2 00
George W. Eshelman, Bird-in-Hand, for best six hand rakes	2 00

To the Williamsport Manufacturing Company, for the best six hay forks, a premium of	$2 00
Williamsport Manufacturing Company, for manure forks, a premium of	2 00
Parsons & Finney, Harrisburg, for best six canal shovels, premium of	2 00
Parsons & Finney, for best six spades, a premium of	2 00
Parsons & Finney, for best six corn hoes	2 00
H. Gilbert, Harrisburg, for best set of horse shoes	2 00
Parsons & Finney, Harrisburg, for best collection of farm tools, a premium of	5 00
T. W. Hankey, Gettysburg, for best rock drill, a premium of	5 00

Class No. 22.—Steam Engines and Castings.

To Reading Manufacturing Company, Reading, Pa., for smut machine, a	Bronze medal.
L. H. Lee, Harrisburg, for a Doty's revolving road scraper, a	Bronze medal.
C. Ridgeway, Coatesville, Pa., for patent mill step, a	Bronze medal.
W. O. Hickok, Harrisburg, for globe valve, a	Bronze medal.
W. O. Hickok, for one gauge cock, a	Diploma.
Messrs. Parsons & Finney, Harrisburg, have a large lot of different size scales for weighing entered, of the Howe patent, which are of superior style and quality. The committee think these exhibitors entitled to a premium of	$5 00
Barnett, Herrman & Co., Springfield, Ohio, for Thomas Leffer's patent turbane water wheel, a	Bronze medal.
W. W. Jennings, Harrisburg, for three elastic boiler tube scrapers, a	Bronze medal.
J. R. Hall, Salem, Ohio, for shingle machine, a	Bronze medal.

The following steam fire engines from Harrisburg were on the grounds, and made a very fine appearance: Citizen, Good Will and Paxton, and also the Mount Vernon Hook and Ladder Company of Harrisburg. None of the named companies were entered for a premium.

C. O. ZIMMERMAN,
JAMES RAWLE,
SAMUEL FISKE,
Committee.

Class No. 23.—Display of Agricultural and Other Useful Articles or Implements.

To Mrs. Jane Wagner, Harrisburg, for case of millinery goods, was awarded the first premium of	$5 00
Mrs. Jennings, Harrisburg, for case of millinery goods, second premium	3 00
Wm. H. Lawser, Harrisburg, for display of fire-arms, first premium	5 00
Wanamaker & Brown, Philadelphia, display of clothing, first premium of	5 00
Jaoob Singer, display of table ware, first premium	5 00
Parsons & Finney, Harrisburg, for display of agricultural implements, first premium	20 00
Myers & Brother, Harrisburg, display of boots and shoes, first premium	5 00
P. A. Altmaier, one case of sporting goods, first premium	5 00
Wiler & Sweeney, for display of carpets, first premium	5 00
Dr. J. P. Keller, general display of household goods, first premium	5 00
Houser & Earnest, general display of household goods, second premium	3 00
S. H. Sieg, one case of stationery, premium of	3 00
W. H. H. Sieg, six frames of specimen printing, first premium	5 00
Gay & Co., display of glass and china ware, first premium	5 00

Class No. 24.—Iron, Steel, Copper, Minerals and Acid.

To D. W. Gross, Harrisburg, for soda ash, a premium of	$1 00
D. W. Gross, for salaratus, a premium of	1 00
D. W. Gross, for muriatic acid, a premium of	1 00
D. W. Gross, for nitric acid	1 00
D. W. Gross, for copperas	1 00
D. W. Gross, for zinc paint	1 00
D. W. Gross, for sulphuric acid	1 00
D. W. Gross, for white lead	1 00
Globe Nail Manufacturing Company, of Boston, for a display of horse-shoe nails, a premium of	3 00
Henry Gilbert, Harrisburg, for 3 bars spring steel, a premium of	2 00
Henry Gilbert, for 7 bars cast steel, a premium of	5 00

CLASS NO. 25.—LEATHER AND ITS MANUFACTURES.

To Samuel A. Hummel, Harrisburg, best set of light harness, first premium	$5 00
Samuel A. Hummel, for assortment of whips	3 00
S. A. Hummel, for traveling satchels and trunks	3 00
D. S. Early, Hummelstown, for bridle, bit, reins and neck fly driver, premium of	5 00
Gregory & Winder, Scranton, Pa., four sides of leather, tanned by a patent process, (very fine specimens,) first premium of	5 00
Franklin Shaud, Harrisburg, for case of shoes	2 00
C. W. & J. Campbell, New York, patent surcingle, first premium,	2 00
Hauser & Berry, Philadelphia, elastic cork horse collar	Diploma.

CLASS NO. 26.—BUTTER, CHEESE AND HONEY.

To Mrs. J. D. Cameron, for the best 10 pounds butter, a premium of	$5 00
Mrs. L. N. Ott, for the second best 10 pounds	3 00
Miss Sallie Moyer, for best 5 pounds	3 00
Jacob Otstot, for the best lot of honey	5 00
Mumma & Repslogle, second best lot	3 00
William E. Black, best bee hive	2 00

CLASS NO. 27.—FLOUR AND INDIAN MEAL.

The committee appointed on Class No. 27, beg leave to offer the following report:

After examining several specimens of very fine flour, we unanimously agree that Mr. E. Warne, of Easton, Pa., exhibited the best barrel of flour, and we therefore award to him the first premium of seven dollars.

D. G. DREISBACH,
R. A. BUCHER,
J. C. HORTON,
CASPER DULL,
JOHN G. UNGER,
J. R. EBY,
Committee.

Class No. 28.—Grain and Seed.

To A. E. Kapp,
President of the Pennsylvania State Agricultural Society:

The Committee on Grain and Seeds, re-organized by the appointment of H. N. M'Allister, Centre county, Henry S. Rupp, Cumberland county, and John J. Rowland, Delaware county, most respectfully report, that the display in this class was highly creditable to the agricultural community. The exhibitions of wheat, oats and barley were severally large, embracing many varieties, excellent in quality. The committee award as follows:

To David Deitz, of Cumberland county, for the best bushel of white wheat, the premium of	$3 00
George Boyer, West Fairview, Cumberland county, for the best bushel of red wheat, the premium of	3 00
For the best bushel of oats, the Excelsior, the premium of	2 00
William C. Huey, assistant superintendent of Central Experimental Farm, at the Agricultural College of Pennsylvania, for the best bushel of barley, Probstier, the premium of	2 00
Do. for one bushel of common four-rowed barley, of superior quality; do., one bushel of Saxoniate barley, an excellent new variety, and one bushel each of three several very superior and new varieties of oats, Excelsior, Somerset and Schonen, all produced on the Central Experimental Farm, from recent importations from Europe. The committee therefore award him for the best sample of newly introduced grain, valuable to farmers, the premium of	5 00
G. A. Deitz, Chambersburg, exhibited a great variety of good wheat, oats and barley, and the committee award to him for the best and largest display of grain seed, the premium of	10 00

J. D. Cameron, E. Hoover and A Boyd Hamilton, Esqs., of Harrisburg, exhibited, severally, beautiful specimens of wheat, distinguished with much difficulty from those to which the premiums were awarded.

The committee award to the Harrisburg Fertilizer Company, for the best bushel of rye, the premium of three dollars.

The display of corn was not large, but the specimens exhibited were excellent.

The committee award to John H. Harper, Harrisburg, for the best bushel of yellow corn, the premium of two dollars.

John Hargest, Harrisburg, for the best bushel of white flint corn, the premium of two dollars.

Jacob Koons, Cumberland county, and J. R. Eby, Harrisburg, severally exhibited one bushel of corn, hardly distinguishable from that to which the premiums were awarded.

The display of potatoes surpassed, both in variety and excellence, any that has ever been made at the State fair.

The committee award to J. R. Eby, Harrisburg, for the best bushel of potatoes—Harrison and Early Rose—the premium of two dollars.

J. T. Rutherford, Harrisburg, for the best half bushel of seedling potatoes, the premium of two dollars.

A. Boyd Hamilton, Esq., Harrisburg, for the largest collection of varieties raised from seedlings, not more than three years under cultivation, consisting of ten varieties, the premium of three dollars.

The committee take great pleasure in noticing, in the highest terms of commendation, the Early Rose and Monitor potatoes exhibited by D. W. Gross, of Harrisburg; the bushel of potatoes exhibited by Isaac Wolford, of Harrisburg; the Harrison potatoes, exhibited by Wm. C. Huey, assistant superintendent Experimental Farm, Agricultural College of Pennsylvania; the Early Rose, Monitor and Early Goodrich potatoes, exhibited by Robert Richmond, Harrisburg; the Peach Blow and Michigan White Sprout, exhibited by Gabriel Hiester, Estherton, Dauphin county; the Early Rose, exhibited by William Hummel, Harrisburg; the Early White Sprout, exhibited by John H. Harper; and the Harrison potatoes exhibited by John Ensminger, Mechanicsburg, Pa.

The committee award to assistant superintendent, W. C. Huey, of the Central Experimental Farm of Pennsylvania, for the best specimen of hay, with mode of curing, the premium of three dollars.

Jacob Wolford, Harrisburg, for the best bushel sweet potatoes, premium of two dollars.

Samuel Flickinger, Susquehanna township, Dauphin county, for the best cucumber seed, the premium of two dollars, and for the best turnip seed the premium of two dollars.

Samuel Flickinger, for the best pound of hops, the premium of three dollars.

Philip Hess, Harrisburg, for the best half bushel of bean seed, the premium of two dollars.

J. H. Sheck, Harrisburg, for the best collection of small seeds, the premium of five dollars.

E. O. Judson, Hornellsville, N. Y., exhibited specimens of what he denominates "joint corn," in the ear and on the stalk, of which he claims to have been the originator or discoverer. The ears are small, but every joint of the corn stalk seems to put forth an ear. He represents it as exceedingly productive; but time and actual experiment alone can test its merits to the favor of the agricultural community.

Dr. J. J. Rothrock, professor of botany in the Agricultural College of Pennsylvania, exhibited a collection of weeds, (plants injurious to vegetation,) neatly and tastefully arranged upon the leaves of a bound volume. The collection embraces many species of weeds, greatly injurious to the farm, lately introduced and now spreading rapidly over the State, of the name and injurious character of which the large majority of farmers are still wholly ignorant, among which is the "blue weed," introduced from the Shenandoah valley during the war. The daisy and Canadian thistle, although introduced many years ago, are not recognized by many agriculturalists until they attain too much foothold to admit of extermination.

The committee take this opportunity to return as well the thanks of the Pennsylvania State Agricultural Society as the thanks of the entire agricultural community, to Dr. Rothrock, for thus directing their attention to the best mode of promoting their interests in the early extermination of weeds.

The Harrisburg Fertilizing Company exhibit samples of super-phosphate of lime—of animal compost, pure ground bone.

Lister & Brother, Newark, N. J., exhibited samples of ground bone, with formula; bone meal, with formula; bone flour, with formula; and of fresh bone super-phosphate of lime, with formula; all of their own manufacture.

The premium list seems to devolve upon the committee the duty of applying chemical tests to the specimens exhibited, with a view to ascertain their relative merits. This was an obligation entirely beyond the ability and incompatible with the time and engagements of the committee, and yet they are anxious to gratify the earnest and urgent desire of the exhibitors that the relative merits of their respective fertilizers should be thoroughly tested. After consultation, the committee came unanimously to the conclusion, that the only safe and reliable test of the quality of the artificial fertilizers, is their actual and accurate use by the farmer. They, therefore, proposed to the exhibitors the donation of their specimens on exhibition, together with such further quantities of each as they should mutually agree upon, either to the Pennsylvania Agricultural Society, for actual test, and report by such agriculturalists as the Executive Committee should designate—or to the Agricultural College of Pennsylvania, for actual test, and report upon the three several experimental farms connected with that institution. The results to be published as well in the transactions of the Pennsylvania State Agricultural Society, as by the college, among the results of the experimental farms.

Fertilizers of equal quality in any quantity required, to be furnished by the exhibitors, respectively, to any farmer in the State, at their regular selling rates, as appear upon their respective cards, at any time within three months from the first of October, 1869. This proposition was promptly and willingly accepted by both the exhibitors, who designated the Agricultural College of Pennsylvania as the recipient of the manures. The specimens on exhibition to be delivered on the fair ground at the close of the fair, and the residue of the donation within ten days from October 1, 1869. The quantity to be furnished by each exhibitor under the foregoing arrangement, as agreed upon by themselves, is one ton, one-fourth of which is of each variety.

The exhibitors signified their assent to the above agreement in relation to fertilizers, by subscribing their names hereto.

LISTER & CO.,
by J. B. RUSSELL.
HARRISBURG FERTILIZING Co.,
by A. BOYD HAMILTON.

SEPTEMBER 30, 1860.

A. P. Erb, Harrisburg, exhibited one Rhombold dry measure, which seems to the committee to be well suited for the measuring of grain with facility. The committee, however, had no means of testing its merits. H. N. M'Allister, Centre county, Pa., being an exhibitor in this class, withdrew from the consideration of the committee all articles placed on exhibition by him.

All of which is most respectfully submitted.

H. N. M'ALLISTER,
HENRY S. RUPP,
JOHN J. ROWLAND,
Committee.

CLASS NO. 29.—COLLECTIONS BY STATE AND COUNTY AGRICULTURAL SOCIETIES.

To A. E. KAPP, ESQ.,
President Pennsylvania State Agricultural Societg:

Collections by State and County Agricultural Societies were the subjects submitted to your committee.

The comparatively early period at which our State society holds its annual fair precludes the county societies from competition in this part of the exhibition. Hence there were few competitors.

The county societies of Cumberland, Lycoming and Franklin were alone found upon our book entries. But your committee take pleasure in awarding to the Cumberland County Horticultural Society the credit of having presented the best and largest collection, for which they are entitled to the first premium of ten dollars.

For the best and largest collection of apples, ten dollars.

For the best and largest collection of pears, ten dollars.

For the best and largest collection of peaches, ten dollars.

For the best and largest collection of grapes, ten dollars.

For the best collection of potatos, six varieties, one peck of each, eight dollars.

For best and largest collection of Irish potatoes, ten dollars.

For best and largest collection of sweet potatoes, ten dollars.

For the best and largest contribution composed of all, or not less than six of the above collections, fifty dollars.

Among the chief attractions of this society was the horticultural hall, which attracted much attention because of its fullness and the judgment and taste which its display made. Almost every species and quality of fruit and vegetables were here exhibited—ripe, preserved and dried. Of the apple, from the Gloria Mundi, [" Glory of the World"—REPORTER,] weighing 22½ pounds, to the tiny crab, the size of a pea; and this collection comprised 121 varieties of apples, and 26 varieties of crabs. Of the grapes, 61 varieties adorned the table; and your committee commend especially the pains taken by this society in displaying the many varieties of the potato. We all recognize this as the most valuable esculent, and any improvement in its quality is to be commended. There was really nothing in the hall to compete with the exhibition which this society made.

The Franklin County Society, through Mr. Deitz, (although its own exhibition has not yet been held,) is entitled to the first premium for the best and largest collection of wheat, of twenty-five dollars.

For the best and largest collection of oats, the premium of ten dollars.

For the best six bushels of wheat, a premium of ten dollars.

For the best six bushels of oats, a premium of six dollars.

Of this collection we ought to add that your committee was struck with the admirable quality of the white wheat—purely white—almost to transparency; and as this is an item which commends itself to the especial interests of farmers, your committee was gratified with the exhibition made of it.

Of the contributions from the Lycoming County Society, the collection was small, and perhaps not intended to compete for the premium, but only to exhibit the quality of the productions of that quarter of the State, and in this they succeeded in satisfying the committee of the excellency of everything they exhibited.

The original committee were none of them in attendance but their chairman, and James Hall and William Goodenow were substituted.

All of which is respectfully submitted.

FREDERICK WATTS,
JAMES HALL,
WILLIAM GOODENOW,
Committee.

CLASS NO. 30.—BEET SUGAR, SUGAR MACHINERY, SORGHUM, MOLASSES, SUGAR CHOPS.

To A. E. KAPP, Esq.,
President Pennsylvania State Agricultural Society:

Your committee of Class No. 30, regret that the competition was not greater in this department, but after an examination of the "Evaporator, Laundry and Feed Boiler and Steamer," exhibited by W. H. Birdsell, of Philadelphia, and patented by Farquar & Doan, of Ohio, we cheerfully award to it the first premium of ten dollars.

D. G. BUSH, *Chairman,*
PETER HOFFER,
C. T. ALEXANDER.

CLASS NO. 31.—VEGETABLES.

To Dr. D. W. Gross, Harrisburg, for three watermelons, a premium of	$1 00
Jacob Wolford, Harrisburg, for one lot of peppers, the premium of	1 00
Jacob Wolford, Harrisburg, for one lot of egg plants, a premium of	1 00
F. O'Keefe, gardener to J. D. Cameron, for best dozen white table turnips, a premium of	1 00
F. O'Keefe, for twelve best parsnips, a premium of	1 00
Peter Hoke, Harrisburg, for best twelve beets, a premium of	1 00
John Hargest, Harrisburg, for best five heads cauliflower, a premium of	1 00
John Hargest, for best six bunches of carrots, a premium of	1 00
John Hargest, for best twelve radishes, a premium of	1 00
Robert Richmond, gardener at the Insane Asylum, Harrisburg, for six heads flat Dutch cabbage, a premium of	1 00
Simon Duey, Harrisburg, for three large, sweet pumpkins, a premium of	1 00
William Stephen, Harrisburg, (from the Riley farm), for best three Marrow squashes, a premium of	1 00
William Stephen, for best twelve tomatoes, (Smith Red,) a premium of	1 00
J. H. Sheck, Harrisburg, for twelve best stalks rhubarb, a premium of	1 00
C. Bucher, Cumberland county, for best watermelons, a premium of	1 00

C. Bucher, for best three varieties of watermelons, a premium of	$2 00
John Harper, for twelve best onions, a premium of	1 00
The Cumberland County Horticultural Society, for the largest sweet pumpkins, a premium of	1 00
Jacob R. Eby, for twelve best ears of yellow corn, a premium of	1 00
J. Harper, for twelve best ears yellow corn, a premium of	1 00
The Cumberland County Horticultural Society, for best variety or collection of vegetables, a premium of	10 00

Class No. 32.—Grapes, Cider, Cordials, &c.

To the President of the Pennsylvania State Agricultural Society:

Sir:—Your committee (No. 32) beg leave to submit the following report:

To John Kepple, Harrisburg, for best half peck Isabella grapes, premium of	$2 00
Wm. T. Hildrup, Harrisburg, for best half peek of Concord grapes, a premium of	2 00
Jacob Haehnlen, Harrisburg, for best half peck, any variety	2 00
Jacob Haehnlen, for best four bunches of Concord	1 00
Pleasant Valley Wine Company, Hammondsport, N. Y., for best four bunches Delaware grapes	1 00
John Sherrich, Cumberland county, for best four bunches Catawba,	1 00
W. T. Hildrup, Harrisburg, for best four bunches Rebecca	1 00
Cumberland County Horticultural Society, for best collection of grapes, foreign or domestic, a premium of	10 00
Cumberland County Horticultural Society, for best collection of native grapes	5 00
Pleasant Valley Wine Company, for best fifteen varieties, (three bunches each,) a premium of	10 00
F. O'Keefe, for the best collection of foreign grapes, a premium of	10 00
Jacob Haehnlen, Harrisburg, for samples of grape training, a premium of	5 00
F. O'Keefe, for best three bunches of foreign grapes, (hot-house culture,) a premium of	3 00
F. O'Keefe, for three best bunches from cold vinery	3 00
Pleasant Valley Wine Company, Hammondsport, N. Y., for best home-made wine, from grapes, "Paris Exposition," the premium of	5 00
Pleasant Valley Wine Company, for second best, "Carte Blanche," a premium of	3 00

Pleasant Valley Wine Company, for best home-made Isabella wine,	$3 00
Pleasant Valley Wine Company, for best Catawba wine	3 00
Pleasant Valley Wine Company, for best Delaware wine	3 00
Pleasant Valley Wine Company, for best from any single variety of grape, (Iona)	3 00
A. H. Baum, Harrisburg, for best currant wine, a premium of	2 00
S. M. Hertzler, Eberly's Mills, Cumberland county, for best blackberry wine, a premium of	2 00
S. M. Hertzler, for best of any other kind, (gooseberry,) a premium of	2 00
Levi Kauffman, Cumberland county, for best sample cider vinegar, a premium of	3 00

The very fine display of fruits by the Cumberland County Horticultural Society is specially deserving notice; and, also, the superior ripened grapes of the Pleasant Valley Wine Company, Hammondsport, Steuben county, New York.

We also desire to make special notice of a fine collection of seventeen varieties of grapes, from the Deitz Experimental Farm, Chambersburg. We also notice a grape box from the manufactory of Fairchild & Bro., Hammondsport, N. Y., a neat, cheap and durable packing case.

Memorandum.—Referring to the very superior display of finely ripened grapes, and the unequalled assortment of native wines, which have already received a world-wide reputation, and competed successfully with the best in foreign countries, your committee suggest the propriety of awarding the Pleasant Valley Wine Company a medal in lieu of the money premiums in the above awards.

JOHN MURDOCK, Jr., *Chairman.*
W. TAGGART,
CHARLES W. HARRIS,
C. B. BROWNING,
H. SHELLENBERGER,
WM. SANDERS,
Committee.

Class No. 33.—Fruits.

To Dr. D. W. Gross, Harrisburg, for best and largest collection of pears, a premium of	$10 00
Charles Crucknell, Harrisburg, for the best 5 fall varieties, 5 pears each, a premium of	3 00
Mrs. Mary Koons, West Fairview, one basket of quinces, best collection, a premium of	5 00

W. S. Sadler, Camp Hill, Cumberland county, for a half bushel pound apples, the second premium of	$2 00
F. O'Keefe, gardener to J. D. Cameron, for peck of uncultivated walnuts, a premium of	1 00
F. O'Keefe, for peck of uncultivated chestnuts	1 00
Mrs. Julia Weitzel, Harrisburg, for a basket of quinces, the second premium of	1 00
Jacob Haehnlen, Harrisburg, for basket of apples, not less than six varieties, the premium of	3 00
W. T. Hildrup, Harrisburg, for collection of winter apples, five varieties, the second premium of	3 00
James Nelson, Indian Run, Mercer county, Pa., for one basket peaches, best collection, six varieties, the first premium of	10 00
James Nelson, for best basket of six varieties, a premium of	6 00
Dr. S. Keller, Elizabethtown, for second best collection of apples, a premium of	5 00
Wm. S. Shaeffer, Harrisburg, for a display of pears	3 00
Wm. Hummel, Harrisburg, for finest variety of winter apples, a premium of	5 00
Aaron Bombaugh, Harrisburg, for five varieties of pears, a premium of	3 00
Thos. Mullen, for second best variety of quinces, a premium of	2 00
W. S. Sadler, Cumberland county, for six varieties of fall apples, a premium of	3 00
Engle & Brother, Marietta, for collection of pears	3 00
Engle & Brother, for collection of apples, fall varieties, a premium of	10 00
Engle & Brother, collection of peaches, a premium of	4 00
Philip Hess, Harrisburg, for six quinces	1 00
John H. Sheck, for basket of quinces	1 00
Nathaniel Wilson, M'Veytown, largest apples	5 00

Class No. 34.—Flowers and Designs.

To Charles Crucknell, Fairhill nurseries, Harrisburg, for twelve varieties choice plants and flowers, (one of each variety,) the first premium of	$4 00
To Charles Crucknell, for six varieties, one of each, the second premium of	1 00
To Charles Crucknell, for one new variety, (Dr. Newman's geranium,) not before shown, the first premium of	2 00

To Charles Crucknell, for a collection of variegated leaf plants, the second premium of	$2 00
To Charles Crucknell, for nurseryman's collection, the premium of	5 00
To Charles Crucknell, for collection of pinks, the first premium of	2 00
To Charles Crucknell, for collection of fuchias, the second premium of	1 00
To Charles Crucknell, for collection of geraniums, the first premium of	2 00
To Charles Crucknell, for collection of dahlias, the second premium of	1 00
To Charles Crucknell, for collection of cut roses, the second premium of	1 00
To Charles Crucknell, for pair round hand boquets, the first premium of	3 00
To Charles Crucknell, for one round bridal boquet, the second premium of	1 00
To Charles Crucknell, for basket with flowers, the second premium of	1 00
To Charles Crucknell, for fancy basket with flowers, the first premium of	2 00
To F. O'Keefe, gardener to J. D. Cameron, for a vase with flowers, the first premium of	2 00
To F. O'Keefe, for decorations for the garden, the second premium of	3 00
To F. O'Keefe, for amateur collection, the first premium of	10 00
To F. O'Keefe, for landscape gardening, the first premium of	10 00
To Robert Graham, Harrisburg, for one pair hand boquets, the first premium of	1 00
To Robert Graham, for vase of flowers, the first premium of	1 00
To Robert Graham, for nurseryman's collection, the second premium of	5 00
To F. O'Keefe, gardener to J. D. Cameron, for furniture appropriate to the garden, the first premium of	2 00
To F. O'Keefe, for collection of pyramidal forms, the first premium of	1 00
To Mrs. Samuel Rutherford, Harrisburg, for a specimen of night blooming cereus, the first premium of	2 00
To Mrs. Samuel Rutherford, for a specimen of the trailing cereus, the first premium of	2 00
To John Kepple, Harrisburg, for twelve varieties of plants and flowers, the first premium of	2 00
To John Kepple, for nurseryman's collection, the first premium of	10 00

To John Kepple, for bedding and out-door decorations for gardens, the first premium of	$5 00
To John Kepple, for collection of pinks, the first premium.	
To John Kepple, for collection of verbenas, the first premium of	2 00
To John Kepple, for collection of seedings, the first premium of	2 00
To John Kepple, for a collection of tube roses, the first premium of	2 00
To John Kepple, for collection of phloxes, the first premium of	2 00
To John Kepple, for collection of roses, the first premium of	2 00
To John Kepple, for collection of dahlias, the first premium of	2 00
To John Kepple, for petunias, the first premium of	2 00
To John Kepple, for pansies, the first premium of	2 00
To John Kepple, for asters, the first premium of	2 00
To John Kepple, for new plants not before entered, the first premium of	3 00
To John Kepple, for a pair round hand boquets, the second premium of	2 00
To John Kepple, for hand boquets, pyramidal form, the first premium of	5 00
To John Kepple, for round bridal boquets, the first premium of	3 00
To John Kepple, for vases with plants, the first premium of	2 00
To John Kepple, for baskets with plants, the first premium of	2 00
To John Kepple, for abutilons, the first premium of	2 00
To John Kepple, for gladiolus, the first premium of	2 00
To William S. Shaffer, Harrisburg, for variety of flowers, the first premium of	10 00
To John Kepple, Harrisburg, for a collection of cactus, the first premium of	2 00
To John Kepple, for one agave, the first premium of	2 00
To John Kepple, for collection of euphastias, the second premium of	1 00
To F. O'Keefe, gardener to J. D. Cameron, for collection of variegated leaf plants, the first premium of	10 00

Class No. 35.—Stoves and Tinware.

Your committee beg leave to report, unanimously, that they have awarded the following premiums:

To George L. Black, Harrisburg, best cooking stoves for coal, the Excelsior, first premium	$5 00
Fager & Maeyer, Harrisburg, best cooking stove for wood, the Excelsior Penn, first premium	5 00

Fager & Maeyer, best cooking range for families, Boynton range, first premium	$5 00
Fager & Maeyer, best furnace for warming houses, base-burning Morning Glory, (set in brick,) first premium	5 00
Fager & Maeyer, best ornamental parlor stove, Morning Glory, first premium	5 00
Fager & Maeyer, best hall stove and heater, Morning Glory base-burner stove, a premium of	5 00
Fager & Maeyer, best portable furnace, Morning Glory base-burner, a premium of	5 00
Jennings & Stœver, Franklin Works, Harrisburg, for best samples iron railing, (set up,) a premium of	5 00

Your committee would call special attention to the Oriental base-burning, brick-set furnace, exhibited by Matthew & Bro.; also recommend very highly the Golden Eagle furnaces, exhibited by Charles Williams, of Philadelphia. They would also call especial attention to the large assortment of stoves exhibited by Messrs. Matthews & Bro., J. B. Harris, H. G. Gilbert & Son, Troy, N. Y., S. H. Ransom & Co., Albany, N. Y., Barrows, Savery & Co., Philadelphia, Shantz & Johnson, Springfield, Pa., and Perry & Co., Philadelphia. Most prominent and useful among the above are the Oriental, Empire, Light House, Morning Light, Beacon Light, the Ventilator, and the self-feeding cook stove, exhibited by Messrs. Matthew & Bro., Harrisburg. Your committee would call especial attention to the machine for manufacturing sheet-iron pans, exhibited by Wm. A. Tarbutton, and recommend that a premium of five dollars be granted him for the same.

N. W. RUSSELL,
ISAAC TOWNSEND,
JOHN WALLOWER,
HENRY ETTELE,
Committee.

CLASS NO. 36.—GLASS, CUTLERY, LAMPS, &C.

To Matthews & Bro., Harrisburg, three marble mantles, (with fire-board stoves inside,) first premium	$5 00
Enoch Morgan's Sons, No. 211 Washington street, New York city, for two boxes sapolio	Bronze medal.
Enoch Morgan's Sons, for three boxes family and laundry soap, first premium	$2 00
John T. Ensminger, Harrisburg, display of cabinetware	Bronze medal.
Isaac Ober & Co., Hummelstown, for display of terra cotta ware,	Diploma.

B. F. Bowen, Cleveland, Ohio, for non-explosive kerosene lamp, a premium of	$3 00
D. W. Gross, Harrisburg, for a sample of frosted window glass, premium of	5 00
D. W. Gross, sample of colored window glass, premium of	5 00
Parsons & Finney, Harrisburg, for one Sherman's patent clothes-wringer, (one tub,) premium of	1 00
Parsons & Finney, for two fairy clothes-horses, premium of	1 00
Parsons & Finney, one fruit-picking basket, premium of	1 00
Parsons & Finney, for half-dozen corn baskets, premium of	1 00
Parsons & Finney, for one lever stuffer and fruit press, premium of	1 00
Parsons & Finney, for two railway sausage stuffers, premium of	1 00
T. F. Boyer, Harrisburg, for patent broom protector, premium of	1 00
Dithridge & Son, Pittsburg, Pa., for patent oval lamp chimneys, premium of	1 00
Eyler & Bro., Harrisburg, for five dozen corn brooms, premium of	1 00
Barrows, Savery & Co., Philadelphia, for two "Home" washing machines, premium of	1 00
Dr. J. P. Keller, Harrisburg, display of table cutlery, premium of	5 00
Mrs. Bucher, Hoguestown, Cumberland county, Pa., for two pounds home-made soap, premium of	1 00
C. F. Sieber, Harrisburg, collection of soap, premium of	1 00
Henry Gilbert, Harrisburg, for fifteen panes of assorted glass,	Bronze medal.
S. C. Gilbert, Harrisburg, for two student's lamps, premium of	$1 00
J. P. Keller, Harrisburg, for collection of pocket cutlery	Bronze medal.
Thomas Worley, Philadelphia, for one case of fancy soap, and a lot of family ditto	Bronze medal.
John Zimmerman, Linglestown, for display of home-made soap, premium of	$2 00

CLASS No. 37.—CLOTHS, LINENS, CARPETINGS, SHIRTINGS, &c.

Mrs. Margaret Oyster, for a piece of rag carpeting, (twenty yards,) the first premium	$5 00
Mrs. A. Rutherford, for pair domestic linen sheets, second premium of	2 00
John Maeurer, one bale rag carpet, (home made,) the first premium	5 00
Mrs. Bucher, Hoguestown, Cumberland county, pair woolen blankets, first premium	5 00

Mrs. J. Rudy, West Orange street, Lancaster, a wedding apron used at her mother's wedding, 85 years ago, worthy of notice from its antiquity, and the committee recommend a premium of	$2 00
Mrs. J. Rudy, Lancaster, for a display of linen, one sheet, one bag and two table cloths, 145 years old, the first premium	3 00
Miss S. S. Rutherford, Harrisburg, one pair linen sheets, (domestic,) first premium	5 00
Miss S. S. Rutherford, one pair blankets, first premium	5 00
Aughinbaugh & Bentz, one case of "Harris seamless kid gloves," worthy of notice.	

Class No. 38.—Quilting, Needle-work, Embroidery, Etc.

To Mrs. H. C. Bohne, Harrisburg, for display of knit-work, (machine,) first premium of	$4 00
Methodist Episcopal Sewing Society, for one log cabin quilt, second premium	1 00
Miss S. R. Weills, Harrisburg, for woolen mittens, first premium of	1 00
Mrs. Julia Weitzel, Harrisburg, for one quilt, first premium	1 00
Mrs. Carrie S. Barr, for silk velvet sofa cushion, first premium	2 00
Mrs. Carrie S. Barr, for bead and worsted work in frame, first premium	3 00
Mrs. Carrie S. Barr, one silk quilt, second premium	1 00
Miss Annie Weitzel, for one bead basket, first premium	1 00
Miss Mary Reichard, for two pieces of embroidery, first premium,	2 00
Mrs. Samuel Flickinger, Susquehanna township, Dauphin county, for two pounds homespun woolen yarn, first premium	2 00
Mrs. O. J. Binde, Harrisburg, for two bead mats, first premium	1 00
Mrs. C. J. Binde, for two bead pin cushions, first premium	1 00
Mrs. Margeret Stahl, Harrisburg, for one log cabin quilt, first premium	1 00
Mrs. Haly, Harrisburg, for several pieces of fancy work, first premium	1 00
Miss Annie Painter, Harrisburg, for one piece of under garment puffing, (made by hand,) first premium	2 00
Miss Maggie W. Denning, Harrisburg, for one piece of needle work, second premium	1 00
Miss Josie Burke, Harrisburg, for one piece of embroidery, silk, first premium	1 00
Miss Julia Murray, Harrisburg, for bead work and cross stitch on canvas, second premium	1 00

Mrs. R. Burnside, Harrisburg, for one sofa pillow, worsted work, second premium	$1 00
Miss Maggie Cameron, Harrisburg, for one foot rest, second premium	1 00
Mrs. Bucher, Hoguestown, Cumberland county, for one yoke night gown, second premium	1 00
Miss I. Kinneard, Harrisburg, for one calico quilt, second premium,	1 00
Miss Kate Ritner, Harrisburg, for one shirt, first premium	1 00
Mrs. Margaret Gilbert, Harrisburg, two silk quilts, (made by a lady 74 years old,) first premium	3 00
Miss Sidney Berghaus, Harrisburg, one foot rest, first premium,	2 00
Mrs. E. M'Conkey, Harrisburg, one bead valence for bracket, first premium	1 00
Mrs. Berghaus, Harrisburg, one quilt, first premium	1 00
Mrs. Caroline Scheffer, Harrisburg, two coverlets, (made by a lady 72 years of age,) first premium	1 00
Miss Sadie Gilliard, Harrisburg, one embroidered yoke and sleeves, first premium	2 00
Mrs. S. H. Seig, Harrisburg, one lace scarf, (hand work,) first premium	2 00
Mrs. E. E. Haldeman, Harrisburg, one quilt, first premium	1 00
Miss Jane E. Weaver, Harrisburg, one stand cover, first premium,	1 00
Miss Lizzie Clendennin, Hoguestown, Cumberland county, one pair woolen stockings, first premium; also, one pair fancy cotton stockings, first premium	1 00
Miss Lizzie Haldeman, Harrisburg, one camp stool, first premium,	1 00

CLASS NO. 39.—KNITTING, CROTCHET AND SHELL WORK.

Miss Mary Seiber, Harrisburg, for a lot of tidies, the first premium of	$2 00
M. E. Sewing Society of Harrisburg, for one lady's breakfast shawl, the second premium of $1. Besides this award of one dollar, a certificate of honorable mention is warmly recommended.	
Miss Susie Welker, of Harrisburg, for a vase of wax fruit, a premium of	2 00
J. H. Smith, M'Allisterville, Juniata county, for toilet set, (four pieces,) for one do., (three pieces,) two mats of pink and white Shetland wool, one zephyr wool shawl, red—a certificate of honorable mention is recommended.	
Miss L. W. Krautter, Harrisburg, for a pair of crotchet slippers, a premium of	1 00

Miss L. W. Krautter, for one knitted cape, (best knit single article,) a premium of.. $1 00

Miss Lillie Cameron, Harrisburg, for a chair seat, a premium of $1 is recommended.

Miss T. Cakes, Chambersburg, best crotchet work, (single article,) a premium of.. 1 00

To White Hall Soldiers' Orphans' school, for a variety of articles, a special premium of three dollars is recommended, or without, a certificate of honorable mention.

To Mrs. E. M'Cormick, for an afghan, a special premium of one dollar is recommended.

To Mrs. Mary M'Cormick, Harrisburg, for an afghan, a special premium of one dollar is recommended.

To Mrs. Bohne, Harrisburg, for best zephyr tidy, a premium of.. $1 00

Miss Ida J. Kepner, for a case of wax flowers, best specimen single, a premium of 2 00

To Miss Lizzie M'Cormick, Harrisburg, for a handkerchief case, two cake mats and a glove box, a certificate of honorable mention is warmly recommended.

To Aaron Hufty, for lamp stand, (burr-work,) a premium of.... $1 00

To Miss C. Alricks, for a pair of afghans, a special premium of one dollar is recommended.

To Miss Amelia Dearie, Harrisburg, for pair of tufted chair patterns, a special premium of one dollar is recommended.

To Miss E. G. Rutherford, Harrisburg, for a crotched shawl, the first premium of $2 00

Mrs. Valentine Feeman, Harrisburg, for second best collection of sea shells, a premium of.................................... 2 00

To Miss C. Kapp, Northumberland, for best afghan, a premium of 2 00

To Mrs. M. B. Priestly, Northumberland, for a pair of children's sacks, (knit by a lady eighty years of age,) best knitted single article, a premium of 1 00

To Mrs. James M'Cormick, Harrisburg, for an afghan, a special premium of one dollar is recommended.

To Mrs. J. S. Haldeman, Harrisburg, for a pair of Turkish cushions, a premium of one dollar is recommended.

To Miss Bucher, Hoguestown, Cumberland county, for best knitted sontag, a premium of.. $1 00

To Miss Amelia Gossler, for best display of tetting, (a yoke and sleeves,) a premium of.. 1 00

CLASS No. 40.—BREAD, CAKES, PASTRIES AND MEATS.

To the President of the Pennsylvania State Agricultural Society:

SIR:—Your committee (No. 40) on bread, cakes, pastries and meats, respectfully submit the following report:

They have awarded to Henry Felix, Harrisburg, for the best display of assorted candies, &c., the first premium of............	$5 00
Mrs. J. Elder, Harrisburg, for the best two loaves of wheat bread, (home-made,) the first premium of........................	2 00
Mrs. S. Toy, second best two loaves of wheat bread, (home-made,) the second premium of....................................	1 00
Also, for the best rusk, the first premium of..................	1 00
Miss Hattie Mahony, of White Hall, Cumberland county, Pennsylvania, Soldiers' Orphans' Home, for pound cake, the first premium of..	1 00
Mrs. M. S. Rutherford, best cup cake, a premium of............	1 00
Also, for the best jelly cake, a premium of....................	1 00
Mrs. John Elder, for best two hams, a premium of.............	8 00
Also, for best gingerbread, a premium of......................	1 00
Also, for best sponge cake, a premium of......................	1 00
Miss Ida Frick, (twelve years of age,) for best fruit cake, a premium of...	2 00

On account of the extreme youth of Miss Frick, and the very fair quality of cake baked by her, the committee recommend a double premium to her.

The exhibition was much better than last year, and the articles were all very creditable. We regret that it was not full.

On behalf of the committee.

D. W. GROSS, *Chairman.*

IN REGARD TO CURING HAMS.—*Statement.*—Salt enough to cover while warm; no saltpetre used; next day cover them with a pickle of salt and water strong enough to carry an egg; let them in pickle six weeks; draw and smoke sufficiently to dry them.

JOHN ELDER.

DAUPHIN COUNTY, *September* 30, 1869.

CLASS No. 41.—PRESERVES AND SPICED PRODUCTS.

To Samuel Flickinger, Susquehanna, for a display of preserves and jellies, the second premium of............................	$3 00
Samuel Flickinger, for two jars preserved peaches, the first premium of...	1 00

Samuel Flickinger, for apple jelly, a premium of	$1 00
Do.........do...quince jelly.....do	1 00
Do.........do...a jar of apple butter, a premium of	1 00
Do.........do....do....peach...do......do	1 00
Do.........do...five cans air-tight peaches, the second premium of	3 00
Samuel Flickinger, for two cans air-tight tomatoes, the first premium of	1 00
Miss Mary Small, Harrisburg, two cans peaches, air-tight, the first premium of	1 00
Mrs. H. Heller, Harrisburg, for one jar spiced peaches, the first premium of	1 00
A. H. Baum, Harrisburg, for two goblets preserved strawberries, the first premium of	1 00
A. H. Baum, for two goblets preserved quinces, the first premium of	1 00
J. C. Jennings, Harrisburg, for a jar of peaches, (brandied,) the first premium of	1 00
Miss Mary F. Small, Harrisburg, for two cans of currants, air-tight, the first premium of	1 00
Miss M. K. Rutherford, Harrisburg, for two tumblers peach jelly, the first premium of	1 00
Mrs. J. Shaeffer, Harrisburg, for a jar of currant jelly, the first premium of	1 00
Mrs. J. Shaeffer, for one jar of strawberry preserves, (2 years old,) a premium of	1 00
Mrs. J. Sims, Harrisburg, for two jars mixed pickles, a premium of	1 00
Mrs. C. Bomgardner, Harrisburg, for a jar of pickled tomatoes, a premium of	1 00
Mrs. J. Shaeffer, Harrisburg, for a glass of cherry preserves, a premium of	1 00
To the Cumberland Valley Horticultural Society, for a display of preserves and jellies, the first premium of	5 00
Mrs. J. Shaeffer, for the best two jars of preserves of any kind, a premium of	1 00
Cumberland Valley Agricultural Society, for best display of air-tight fruits, the first premium of	5 00
Cumberland Valley Agricultural Society, for best display of spiced fruits, the first premium of	5 00
Cumberland Valley Agricultural Society, for best display of pickles, the first premium of	5 00

CLASS No. 42.—FINE ARTS AND PENMANSHIP.

HON. A. E. KAPP,
President Pennsylvania State Agricultural Society:

DEAR SIR:—The committee on class No. 42, respectfully report and award to Mrs. Robert Purvis, for best collection of paintings, silver medal or fifteen dollars.

Miss Sallie Van Horn, for best collection of colored crayons	$3 00
Miss S. E. Mather, for crayon picture	1 00
Miss Fager, for best oil painting	3 00
Mr. J. N. Currey, Hummelstown, penmanship	2 00
Mr. A. J. Whitney, landscape	3 00
Miss Miller, water colors	3 00
Miss Kate Swartz, (11 years old,) crayon	1 00
Miss E. A. Morris, meritorious portrait—crayon	1 00
Miss Maze Wagner, colored medley	1 00

Your committee desire to commend two photographic views of the residence of Colonel T. P. Knox, Norristown, by Mr. S. R. Fisher, as a specimen of scenic photography.

Difficulty was experienced in making up the judgment of your committee by the extensive display, and the almost equal merits of the competitors, in several divisions of their department. The crayon pictures, especially, show fine artistic cultivation, and in addition to those to whom awards were made, the pictures of Miss Ida Kepner and Miss Laura Green were meritorious.

Respectfully,
JNO. H. ZIEGLER,
J. H. JENKINS,
S. H. SIEG,
Committee.

CLASS No. 44.—UNCLASSIFIED ENTRIES.

To Mrs. H. C. Bohne, Harrisburg, for Lamb's knitting machine, a	Diploma.
George Raff, Adams county, for Climax knitting machine, a	Diploma.
Watson & Co., Harrisburg, for specimens of gold leaf, a	Diploma.
Moses Gruber, Stouchstown, Berks county, for a case of stuffed birds, first premium	$3 00
W. A. Middleton, Harrisburg, for metallic screw fence post butt	Diploma.
W. A. Middleton, for release and safety horse hitch, a	Diploma.
W. A. Middleton, for clothes hook and line holder	Diploma.
H. Cohen, Harrisburg, display of hoop skirts and corsets	Diploma.

William Knoche, Harrisburg, for one large mirror	$1 00
Jonas Rauch, Selinsgrove, Snyder county, for hoisting machine for painters' use	Diploma.
J. V. P. Weaver, Mechanicsburg, Pa., for one case of specimens from natural history, first premium	$10 00
Barrows, Savery & Co., Philadelphia, for combined dining-room water-cooler and refrigerator	Diploma.
D. S. Early, Hummelstown, for buggy top fastener	Diploma.
T. T. Markland, for patent name plate and street lamp	Diploma.
James A. Foster, Philadelphia, for display of artificial limbs	Diploma.
Parsons & Finney, Harrisburg, for one steel composition church bell	Diploma.
J. Heagy, New Kingston, for Lloyd's reversible map	Diploma.
Bucher, Gibbs & Co., Canton, Ohio, for display of ornamented bracket shelves	Diploma.
Beaver Falls Cutlery Company, Beaver county, for Rowan's combination spring	Diploma.
P. Bernheisel, Harrisburg, lot of lime, premium of	$2 00
Miss Ida B. Rutherford, Harrisburg, for one case of insects, premium of	1 00
John A. Snyder, Georgetown, for a rail and post machine	Diploma.
B. F. Mohr, Lewisburg, for a wood-boring machine	Diploma.
Dr. J. P. Keller, Harrisburg, for a display of bird cages and walnut brackets, a premium of	$3 00
D. T. Wilson, Harrisburg, for a fruit-drying house	Diploma.
G. G. Dulaney, Mechanicsburg, for one safety whiffle-tree, first premium	$2 00
Maiser, Philadelphia, for patent fire-proof safe	Diploma.
Walker, Griffith & Co., for line-holder for carriages, first premium,	$1 00
Brady Manufacturing Company, Mt. Joy, for one stove and furniture hoister	Diploma.
A. C. Taylor & Co., South Vineland, New Jersey, for patent clothes frames	First premium.
W. H. Sible, Harrisburg, for patent brace	Diploma.
W. H. Sible, Harrisburg, sash hoist and fastener	Diploma.
W. H. Sible, for combined mortice and tennon machine.	
W. H. Sible, for patent shutter fastener	Diploma.
Miss Fanny Eby, Harrisburg, for one Paris doll, premium	$1 00
Erie City Iron Works, Erie, Pa., for one set head blocks for saw-mills	Diploma.
George F. M'Farland, Harrisburg, for three sections of school desks and seats	Diploma.

Singer & Son, Harrisburg, for Paris indigo blue, for washing purposes, first premium	$1 00
Lumber Manufacturing Company, Lewisburg, Pa., seven school desks, second premium	3 00
Mrs. Frisch, Harrisburg, for case of specimens of natural history, (birds,) premium	2 00
Jacob Sheets, Sunbury, Pa., for self-raising scaffold ladder, second premium	1 00
David Shockey, Waynesboro', Pa., for patent folding entrance gate	Diploma.
Drawbaugh Manufacturing Company, Eberly's Mills, Cumberland county, for patent rotary self-measuring faucet	Diploma.
B. F. Myers & Co., Harrisburg, for specimens of printing cards	Diploma.
Mrs. Jay, Canton, Ohio, for the nutshell sash lock, second premium	$2 00
B. K. Taylor, Harrisburg, one tweer	Diploma.
A. Good & Co., Allentown, Pa., for the famous boot-tree	Diploma.
Parsons & Finney, Harrisburg, for one bag holder and truck combined, first premium	$1 00
R. L. Wolcott, New York city, for " Pain Paint," a medicine	Diploma.
Isaac Evans, Dayton, Ohio, for an upright drill press	Diploma.
Miller & M'Clelland, Urbana, Ohio, patent awning	Diploma.
Jas. Scott, Pittsburg, for model razor strops, first premium	$1 00
Jas. Scott, for diagram for cutting garments	Diploma.
T. B. James, Cumberland county, for display of window shades	Diploma.
A. Bean, Fairview, Cumberland county, for improvement on cart shafts	Diploma.
American Basket Company, of New Brilin, Conn., for the American berry basket and crate	Diploma.
William Burwell, Philadelphia, for one case of silver and gold mountings for carriages	Diploma.
Geo. Raff, for one climax knitting machine	Diploma.
Dana Sherman, Franklin county, Pa., for one patent boot leg turner	Diploma.
Samuel Markle, Roseburg, Pa., for one slicing machine	Diploma.
Harrisburg Fire Brick Works, for six fire brick, a premium of	$1 00
Geo. Unger, Danville, for Unger's improved post socket, second premium	1 00
A. B. Tallman, No. 511 Chestnut street, Philadelphia, for patent self-balancing inkstand and perpetual calendar	Diploma.
Watson & Wilson, Lancaster, Pa., for stovepipe shelf	Diploma.

PREMIUMS AWARDED

At the Exhibition at Scranton, 1870.

CLASS NO. 1.—THOROUGHBRED HERDS.

H. H. Skinner, Silver Lake, Pa., best short-horn herd, premium	$50 00
Christopher Byrnes, St. Joseph, Pa., best Ayrshire herd	50 00

CLASS NO. 2.—THOROUGHBRED CATTLE—DURHAM

H. H. Skinner, Silver Lake, Pa., first premium for three year old bull	$30 00
James E. Carmalt, Montrose, Pa., for bull, "Gasonmeter," three years, second premium	15 00
Isaac Tripp, Kingston, Pa., short-horned bull, two years old, first premium	20 00
James E. Carmalt, Montrose, short-horned bull, "Grassfield," two years, second premium	10 00
Ezra Cornell, Ithaca, N. Y., short-horned bull, one year, first premium	15 00
James E. Carmalt, Montrose, one year old, second premium	5 00
Ezra Cornell, Ithaca, N. Y., best short-horned bull calf, under one year, first premium	8 00
H. H. Skinner, Silver Lake, second best bull calf, under one year, second premium	5 00
Ezra Cornell, Ithaca, N. Y., best short-horn cow, "Lucia," three years, first premium	20 00
H. H. Skinner, Silver Lake, short-horn cow, "Stately," three years, second premium	10 00
James E. Carmalt, Montrose, best short-horn heifer, "Eliza," two years, first premium	15 00
Ezra Cornell, Ithaca, N. Y., short-horn heifer, two years, "Fidget," second premium	10 00
H. H. Skinner, Silver Lake, best short horn heifer, "Duchess," one year, first premium	10 00
Ezra Cornell, Ithaca, N. Y., short horn heifer, one year, second premium	5 00

H. H. Skinner, Silver Lake, best short horn heifer calf, under one year	$5 00
James E. Carmalt, Montrose, second best short horn heifer calf, under one year	3 00

Devon.

Harry Smith, Upsonville, Pa., best bull, "Duke," three years, first premium	30 00
Thomas D. Sax, Old Forge, Pa., second best bull, "Pathfinder," three years, second premium	15 00
Harry Smith, best cow, "Rose," three years, first premium	20 00
C. J. Hollister, Susquehanna county, second best cow, three years, second premium	10 00

Alderney.

Joseph Washburn, North Jackson, Pa., best bull, three years, first premium	30 00
L. W. Morss, Ledgedale, Pa., second best, "Pillow," three years, second premium	15 00
Ira Tripp, Scranton, best bull calf, first premium	8 00
L. W. Morss, second best bull calf, second premium	3 00
L. W. Morss, best cow, three years, first premium	20 00
L. S. Oakley, Wilkesbarre, second best cow, three years, second premium	10 00
Ira Tripp, Scranton, best heifer, two years, first premium	15 00
L. W. Morss, second best heifer, two years, second premium	10 00

Aryshire.

Christopher Byrnes, St. Joseph, Pa., best bull, "Montrose," one year, first premium	15 00
J. F. Butterfield, Montrose, second best bull, "Charlton Boy," one year, second premium	5 00
Christopher Byrnes, best cow, "Matchless," three years, first premium	20 00
Christopher Byrnes, second best cow, "Madge," three years, second premium	10 00
J. F. Butterfield, best heifer, "Bonnie Lassie," two years, first premium	10 00
Christopher Byrnes, second best heifer, "Maid of the Lake," two years, second premiums	5 00
C. B. Reynolds, Factoryville, Pennsylvania, best bull, three years, first premium	30 00

Committee recommend premiums as follows: To Mrs. Amanda Jessup, for fine Durham bull "Conqueror," premium	$15 00
To J. D. Ward, for fine Durham bull, premium	15 00

CLASS 3.

Isaac Tripp, Kingston, pair fat steers, first premium	$15 00
John M'Kever, Hyde Park, one fat steer, first premium	10 00
James E. Carmalt, best display of fifteen head of cattle	30 00
C. J. Hollister, two yoke of oxen	15 00
B. F. Akerly, Clark's Green, yoke of oxen	10 00

Executive Committee award special premium of $5 to C. J. Hollister, as the best driver of two yoke of oxen.

CLASS 4.—NATIVE AND GRADE COWS.

Amanda Jessup, Montrose, best grade Durham cow	$10 00
H. H. Skinner, best grade short horn cow, "Beauty," by a thoroughbred sire	15 00
H. H. Skinner, for grade Devon	10 00
J. H. Hollister, native cow	10 00
J. H. Hollister, for two grade Devon heifers, two years	Special premium.
J. H. Hollister, one native calf	$7 00

CLASS NO. 5.—FINE BRED HORSES, MARES AND COLTS.

John E. Wynkoop, Shippensburg, Pa., for best thoroughbred racing stallion, "Vidette," first premium	$75 00
John E. Wood, Middletown, N. Y., for fine bred Hambletonian stallion, "Knickerbocker," first premium	75 00
Major Hicks, Pittston, for fine bred Hambletonian stallion, "Orange County," second premium	50 00
Dr. P. H. Gardner, Clifford, Pa., for Black Hawk stallion, "Tecumseh," third premium	25 00
Fitzpatrick & Drew, Scranton, best fine bred stallion, "Bobbie," three years, 1st premium	40 00
J. & A. Wells, Fleetville, Pa., best brood mare with foal at her foot, "Bonner Mare," premium	20 00
Robert Dempster, Phillipsburg, N. J., best mare four years and upwards, first premium	25 00

John E. Wood, Middletown, N. Y., second best	$10 00
Isaac J. Post, Scranton, best three years mare colt, "Nellie," first premium	20 00
Isaac J. Post, Scranton, best two years mare colt, "Maggie"	15 00
George Lazarus, Pittston, second best mare colt, two years	5 00

CLASS NO. 6.—TROTTING HORSES, MARES AND GELDINGS.

W. Bodine names b. m., "Lady Whitman," first premium	$300 00
James Clark names s. g., "Sorrel Dan," second premium	150 00
Robert Dempster names b. m., "Greenwich Maid," third premium; (time, 2:38¾, 2:35, 2:34¾)	50 00
James H. Morey names b. m., "Ella," first premium	100 00
H. O. Silkman names b. g., "Scranton Boy," second premium	50 00
Frank Wagner names b. g., "Dan," first premium	75 00
George W. Rand names blk. s., "Jim," second premium	15 00
P. Eckrot names r. g., "Frank," third premium	10 00
Dennis Sheehan names b. m., "Flora," first premium	25 00
L. S. Kingsbury names b. m., "Lady Howard," second premium,	15 00
Ira Tripp names blk. m., "Lady Jane," third premium	10 00
Peter Eckrot names b. h., "Reuben," first premium; Frank Wagner names b. m., "Ella," second premium; Robert Dempster names s. g., "Dr. Jackson," third premium	50 00
Geo. W. Rand names s. g., "Starlight," trotter to saddle, first premium	30 00
Robert Dempster names b. g., "Come by Chance," pacer to saddle, second premium	10 00

CLASS NO. 7.—MATCHED AND SADDLE HORSES.

Isaac Tripp, Kingston, best pair matched horses, one color, first premium	$15 00
H. H. Harrington, Montrose, best pair matched mares, one color, first premium	10 00
J. Turvey Fellows, Hyde Park, 2d best, second premium	6 00
Hill & Fellows, Hyde Park, best pair heavy draught matched horses, very fine, first premium	20 00
A. A. Nichols, Clark's Green, best pair farm mares, heavy draught, first premium	15 00
M. E. Bramhall, Tunkhannock, best gelding for saddle, first premium	15 00

J. H. Burns, Scranton, best gaited mare for saddle, first premium,	$15 00
Robert Dempster, Phillipsburg, N. J., 2d best gelding for harness, premium	5 00
John E. Wynkoop, Shippensburg, Pa., best family horse, first premium	15 00
A. F. Brigham, Clark's Green, best family mare, first premium	15 00
M. E. Bramhall, Tunkhannock, 2d best family mare, second premium	5 00

Class No. 8.—Stallions and Mares for all Work.

C. Mathewson, Factoryville, Pa., best heavy draught stallion, 9 years, first premium	$25 00
Robert Dempster, Phillipsburg, Pa., stallion, "Bashaw Chief," premium	25 00
Ira Tripp, Scranton, best stallion, "Empire State," quick draught; seven years, got by Hambletonian	25 00
W. H. Fitch, Mt. Pleasant, stallion, "Young Abdallah," first premium	20 00
James V. Decker, Clark's Green, blooded mare with foal at her foot, first premium	25 00
J. & A. Wells, Fleetville, Pa., stallion, "Bonner," four years, first premium	20 00
Abner Cobb, Dundaff, stallion colt, two years old, second premium,	5 00
Frederick Schmaltz, second best three years old mare colt, first premium	10 00
E. L. Weeks, one draught stallion, two years	Diploma.
G. Mulinx, Waverly, brood mare with foal at her foot, second premium	$10 00
L. G. Daman, Pittston, brood mare, first premium	15 00
L. G. Daman, Pittston, stallion, three years, first premium	15 00
F. Belknap, Carbondale, stallion, "Young Bonaparte," four years, second premium	10 00
J. Ackerly, Providence, stallion, heavy draught, "Black Lyon," four years	Diploma.
George W. Rand, Morgan stallion, "Jim," ten years, first premium,	Diploma.

(Mr. Rand's stallion also won the sweepstake premium for trotting in Class 6.)

W. H. Reynolds, Moscow, one heavy draught gelding, weight 1,750 pounds, very fine animal, to whom committee award	Diploma.

Class No. 9.—Jacks and Mules.

Brown Bro., Forest Lake, best imported Spanish jack, "Samuel," first premium	$25 00
Hileman & Ebert, Pittston, best pair of mules, first premium	20 00
Ira Tripp, Scranton, second best premium	10 00
J. Turvey Fellows, Hyde Park, best running mule	5 00
J. Turvey Fellows, Hyde Park, best trotting mule	5 00

Class No. 10.—Flocks and Fleeces.

H. Halpin, Friendsville, pen nine Cotswold ewes, first premium	$40 00
T. S. Cooper, Coopersburg, second best, second premium	20 00
J. T. Conover, Clinton, N. Y., best pen nine Southdown ewes, first premium	40 00
T. S. Cooper, best Cotswold ram and ten lambs of his get	30 00
J. T. Conover, best Southdown ram and five lambs of his get	30 00
R. W. Shaw, Providence, Leicester and Bakewell ram and five lambs of his get, premium	15 00
L. J. Burchard, Burchardsville, best fleece	10 00

Class No. 11.—Fine Bred Sheep.

John Watts, Ithaca, N. Y., best Southdown buck, two years, first premium	$20 00
John Watts, Ithaca, N. Y., best five ewes, first premium	20 00
L. P. Burchard, Burchardsville, best Saxony and Merino buck	20 00
L. P. Burchard, Burchardsville, second best Saxony and Merino buck, two years	10 00
T. S. Cooper, best long wool buck	20 00
T. S. Cooper, best five long wool ewes	20 00
Thos. H. Kane, St. Joseph, Pa., best five yearling long wool ewes,	15 00
Thomas H. Kane, St. Joseph, Pennsylvania, best long wool ewe lambs	10 00
J. T. Conover, Clinton, New Jersey, best Southdown ewes, five in number, under two years	15 00
J. T. Conover, best Southdown buck, under two years	10 00
J. T. Conover, best buck lamb	5 00
J. T. Conover, best five ewe lambs	10 00
A. Wadsman, Benton, Leicester grade, buck lamb	5 00
R. & H. J. Rose, Silver Lake, Cotswold buck	15 00
Oris Setser, second best, second premium	8 00
H. Halpin, five Cotswold ewes	15 00

Class No. 12.—Swine.

E. B. Ashbridge, East Goshen, Chester county, Pa., best herd of pure Chester white pigs, more than twenty head, (first medal ever awarded for hogs)	Silver medal.
E. B. Ashbridge, best boar pig, "Jim Burns," two years, first premium	$10 00
E. B. Ashbridge, best sow, fourteen months old	10 00
E. B. Ashbridge, second best, thirteen months old	5 00
E. B. Ashbridge, best boar pig, fifteen months old	5 00
E. B. Ashbridge, best boar pig, five months old	5 00
E. B. Ashbridge, second best boar pig, five months old	3 00
E. B. Ashbridge, best sow pig, six months old	5 00
H. P. Jacobs, Hyde Park, for fine lot of five native pigs, the Executive Committee recommend a special premium of	5 00
E. B. Ashbridge, best lot of seven pigs, eight weeks old, first premium	5 00
J. D. Ashbridge, best lot of Chester White pigs, eight in number, eight weeks old	Bronze medal.

Class No. 13.—Poultry.

H. P. Jacobs, Hyde Park, for best trio of any kind, (Brahmas,) first premium	$5 00
Dr. Chas. H. Stevens, Scranton, pair of domestic turkeys, first premium	2 00
John Jeffords, Hyde Park, pair of Hong Kong geese, first premium	3 00
C. M. Parker, Waverly, one pair of ducks	3 00

Class No. 14.—Plows and Plowing.

D. W. Harstein, Philadelphia, exhibited Godfrey's Revolving Mould Board plow, which was tested in presence of the committee with full satisfaction.

Sayre & Bro., Montrose, exhibited plows and root digger of great merit.

G. W. Miller & Bro., Old Forge, exhibited a creditable variety of plows. No premium on account of not being tested in presence of committee.

George E. Chamberlin, Montrose, best plowman	$10 00

CLASS No. 15.—REAPING AND MOWING MACHINES.

The committee reported as follows: The Meadow King mower, manufactured by Gregg, Plyer & Co., Trumansburg, N. Y., and exhibited by A. H. Gregg, Ithaca, N. Y., is deserving of especial mention, it being very simple of construction and evidently very durable and strong, being composed almost entirely of iron and steel. The novel device by which the cutter bar is raised from a horizontal to a perpendicular, allowing the knives and pitman to remain in the same line, and always running with equal ease at any angle, is certainly a novel and valuable improvement in mowing machines. The manner also of getting the side draft is a good feature.

The committee further reports that most of the mowers on exhibition were of the first class, but there being no opportunity to test them, as required by the regulations of the society, they could not prove the best upon actual trial, and only what seemed to be a decided improvement was noticed. The combined reaper and mower, exhibited by E. Ball & Co., Canton, Ohio, exhibits first-class workmanship in its mechanical construction. In regard to the Hubbard self-rake reaper, the raking attachment is considered unsurpassed for simplicity and apparent ease of operation. The Cayuga Chief self-rake reaper has an improved rake and an attachment for moving the rake, and is so arranged as to avoid side draught. J. H. Keller & D. Lorce exhibited a reaper reel post, with flexible joint that showed much ingenuity in its construction. The Bullard hay tender was the best the committee was called upon to examine, and we deem it worthy of special mention.

CLASS No. 16.—THRESHING MACHINES AND HORSE POWER.

Miller & Avery, Tunkhannock, one two-horse railway power, one combined thresher and cleaner; threshed 46 sheaves of wheat in 11 minutes and 45 seconds.

Minard Harder, Cobleskill, N. Y., one two-horse railway power, tried with 46 sheaves of wheat, threshed in 7 minutes and 35 seconds.

Trenton Agricultural Works, N. J., one two-horse power and one combined thresher and cleaner; threshed 46 sheaves in 6 minutes and 37 seconds. Recommend diploma.

E. Ball & Co., Canton, Ohio, exhibit ten-horse lever power and one thresher, cleaner and bagger.

Geiser Manufacturing Company, Waynesboro', Pa., exhibit one combined thresher, cleaner and bagger, and one eight horse power. These machines are all highly recommended.

Guy S. Frazey, Lancaster, one fodder cutter and grinder. Recommended for special mention and diploma.

Hunt Bros., Scranton, full assortment Burdock's straw and fodder cutters. They exhibit great capacity and good workmanship, and are recommended for favorable mention and diploma.

Maloney, Pratt & Co., Scranton, one cutter box of good capacity.

D. Chaffie, Rome, N. Y., straw cutter, direct acting hand lever, good for general use on small farms.

T. C. Aspinwall, Albany, N. Y., one corn sheller, worthy of special mention and diploma.

The corn husker exhibited by the Pennock Manufacturing Company, Kennett Square, Pa, and by Sayre Bros., Montrose, Pa., are compact, effective machines, do their work well, and are every way reliable.

L. Boyer, Philadelphia, one farm and grist mill, operates well for persons isolated from mills; has power of great value.

CLASS NO. 17.—CIDER MILLS, CHURNS, AND ARTICLES OF SIMILAR CHARACTER.

Maloney, Pratt & Co., American submerged pumps, a good article.

Maloney, Pratt & Co., cider mill, best on exhibition.

Isaac Taylor & Son, Wilkesbarre, two pumps for wells, very fine, and work well.

Hull & Shopland, Scranton, one butter pail, superior article.

Hull & Shopland, wooden milk bucket, premium $2.

Hunt Bros., Scranton, one dozen milk pans, first-class articles.

A. Carr, 43 Courtland street, N. Y., steam pump, superior article, working smoothly, award bronze medal.

Sayre & Bro., Montrose, dog-power, best on exhibition.

Sayre & Bro., one well curb or water drawer, very superior.

D. K. Overhiser, Williamsport, Pa., one adjustable air-churn dasher; butter from sweet milk in eight minutes.

C. H. & W. G. Doud, best milk pans of all sizes, $2.

Hunt Bros., two milk churns for carrying milk, &c., $2.

CLASS NO. 18.

F. Gardner & Co., Carlisle, one grain drill of the highest mention, recommended to all.

Belvidere Manufacturing Company, N. J., good drill, favorably mentioned.

John Garman, Harrisburg, cultivator and car plow combined, which every farmer should have.

Centre Hall Manufacturing Company, best corn-planter and fertilizer on the ground.

Sayre & Bro., Montrose, one excellent cultivator, favorably mentioned.

C. L. Whait, Waverly, cultivator, good article, well recommended.

D. Landreth & Son, Philadelphia, Cahoon's broad-cast grain and grass seed sower, by hand or horse power, excellent article, recommended for diploma.

W. T. Best, Scranton, splendid patent churn, not provided for in our class, but we award it special mention.

In grain drills, Bristol and Robbins, New York, have two splendid specimens on exhibition. Good pulverizers and fertilizers in distribution. The "Farmer's Favorite," by Barkford & Hoffman, is altogether the best single grain drill in workmanship and good points, and, in the opinion of the committee, superior to all others.

Class No. 19.—Wagons, Carts, Drays and Carriages.

William Bloom & Co., Providence, improved spring trotting wagon	Bronze medal.
Allen Anderson, two wheelbarrows, premium	$2 00
John Barry & Co., Oswego, N. Y., best leather top buggy, first premium	5 00
John Barry & Co., best single seated phæton, first premium,	Bronze medal.
John Barry & Co., best open buggy, first premium	$5 00
John Barry & Co., best three seated platform spring wagons, first premium	5 00
B. F. Frailey, Honesdale, one gravel-dirt wheelbarrow, premium,	2 00
Moore & Ross, Oswego, N. Y., one-horse sleigh, first premium	5 00
D. S. Roberts, Scranton, two-horse sleigh, first premium	5 00
William Ballard, Carolina Depot, New York, best wagon brake, premium	2 00
Bloom & Co., Providence, spring market-wagon, premium	3 00
Laycock & Crouse, two-seated phæton, first premium	5 00
O. T. Gaines, Pittston, pony phæton, first premium	2 00
J. H. Matchin, wagon jacks, first premium.	

Class 20.—Miscellaneous Farm Tools.

W. H. Strant, Danville, Pennsylvania, hay fork	$2 00
Henry White, Hollisterville, Pennsylvania, hand rakes	2 00
Montrose Fork Manufacturing Company, Montrose, hay forks	2 00
Montrose Fork Manufacturing Company, Montrose, straw forks,	2 00
Montrose Fork Manufacturing Company, Montrose, manure forks,	2 00
C. H. & W. G. Doud, Scranton, collection carpenters' tools	3 00

Class 21.—Steam Engines and Castings.

Dubois & Buegler, Williamsport, scroll sawing machine	Bronze medal.
F. D. Green, Williamsport, panel machine	Bronze medal.
W. E. Butler & Co., Taft's patent saw sharpener	Diploma.
Hunt Bros., Scranton, Emerson's perforated tooth circular saw, and Emerson's perforated tooth splitting saw	Diploma.
Hunt Bros., Scranton, Beecher's bark mill	Bronze medal.
L. Boyer &. Bro., Philadelphia, rotary road scraper	Diploma.
E. W. Todd, Scranton, collection of drain pipe	Diploma.
Finch &. Co., Scranton, circular saw mill	Diploma.
Sayre & Bro., Montrose, two-horse road scraper	Bronze medal.
A. Bittenbender, Scranton, patent rip, cross, and timber saw, rotary vices	Diploma.
Blake & Fessendon, Beaver Falls, Pa., display of files	Bronze medal.
Broadbank & Culver, Scranton, patent steam and water stop valve	Silver medal.
C. H. & W. G. Doud, Scranton, Pa., display of scales	Bronze medal.

The committee would recommend a silver or gold medal if it was in their power to do so. These scales were tried to the entire satisfaction of the committee, and showed the best mechanical finish, as well as the closest and most evenly balance.

The attention of the committee was called to the engine used by the society for motive power, furnished by the Dickson Manufacturing Company, of Scranton, and after a thorough examination, take pleasure in recommending the same as one of the finest specimens of mechanicism they have ever seen. It is noiseless in its movements and clearly shows that there is little or no friction. In a word, it is a paragon of excellence, combining strength, power, compactness, mechanical skill in finish, style, and harmony of proportion. The committee would respectfully recommend a gold medal.

CLASS No. 22.—DISPLAYS OF AGRICULTURAL AND OTHER USEFUL ARTICLES OR IMPLEMENTS.

Sayre & Bro., Montrose, Pa., best and largest display of agricultural implements	$30 00
Michael Norton, Scranton, display of books, stationery, wall paper, &c.	Diploma.
C. A. Hernans, Scranton, display of boots and shoes	Special mention.
F. S. Pauli, Scranton, display of hats, caps, furs, &c	Diploma.
Mrs. E. S. Reed, Scranton, first premium, display of fancy dry goods and trimmings	$5 00
Isabella Browning, Scranton, first premium, display of millinery..	5 00
W. G. Doud, Scranton, first premium, collection of kitchen utensils and tinware	5 00

CLASS No. 23.—IRON, STEEL, COPPER, MINERALS AND ACIDS.

W. Lutzinger & Co., Scranton, coal screens	$2 00
John Maclaren, Scranton, display of finished and rough brass castings, ingot copper, spelter, &c	Diploma.

The fine specimens of coal (2½ tons weight) placed on exhibition by D. Langstaff, superintendent of the Diamond mines, deserves more than the monied premium, and the Executive Committee recommend a diploma.

CLASS No. 24.—LEATHER AND ITS MANUFACTURES.

Eugene Snyder, Dunning, Pa., crop sole leather	$5 00
James Jenkins, N. Y., double harness	5 00
Do..............single harness	5 00
Gregory & Wandee, Scranton, sole leather tanned by patent process	2 00
G. M. Fritz, Scranton, trunks, traveling bags, &c.	3 00

CLASS No. 25.—BUTTER, CHEESE AND HONEY.

E. Mott, Friendsville, Pa., best firkin butter	$10 00
Do..............do......butter worker	1 00
A. C. Watson, Moscow, Pa., tub butter	5 00
A. C. Watson, Moscow, Pa., best lot made in August	10 00
Goodrich & Perry, Susquehanna county, best lot made in June..	10 00
H. Brewster, Montrose, best lot, ten pounds	5 00

Miss P. R. Hollister, Susquehanna county, first premium, girls under twenty-one years of age	$5 00
George Walker, Dimmick, Pa., firkin butter	10 00
Horace Brewster, Montrose, best cheese less than one year old	5 00
George H. Hamlin, Susquehanna county, second premium	3 00
Jacob Ottstot, Mechanicsburg, Pa., honey, first premium	5 00
John Duncan, Mechanicsburg, Pa., second premium, honey	3 00
Thomas Hutchins, Wyoming, Pa., honey	3 00
Tillinghast Bro., Factoryville, Pa., honey and bee hive, favorable mention.	

Class No. 26.—Flour and Indian Meal.

S. Newhart, Tunkhannock, Pa., best barrel red wheat flour	$5 00
G. W. Palmer, Humphreysville, Pa., half bushel buckwheat meal,	2 00
P. H. Drake & Co., N. Y., Rand's sea moss farine	Diploma.

Class No. 27.—Grain and Seeds.

Central Experimental Farm, W. C. Huey, superintendent, best bushel white wheat	$3 00
George E. Boyer, Cumberland county, best bushel red wheat	3 00
Central Experimental Farm, W. C. Huey, superintendent, best and largest variety of wheat	5 00
Central Experimental Farm, W. C. Huey, superintendent, best bushel rye	3 00
Samuel Hugh, Ransom, Pa., best bushel corn	2 00
George Fink, Montrose, Pa., best bushel oats, (Somerset)	2 00
Central Experimental Farm, W. C. Huey, superintendent, largest display of grain seeds	10 00
Robert Shaw, Providence, Pa., best bushel Early Rose potatoes	2 00
Central Experimental Farm, W. C. Huey, superintendent, largest collection potatoes from seedlings	3 00
E. A. Atherton, Abington, Pa., best quart onion seed	2 00
Central Experimental Farm, W. C. Huey, superintendent, best bushel barley	2 00
Central Experimental Farm, W. C. Huey, superintendent, best specimen of hay	3 00

Class No. 28.—Collections of Agricultural Societies.

Cumberland County Horticultural Society, six bushels yellow corn,	$7 00
Ditto, six bushels potatoes	6 00
Ditto, collection potatoes, twenty-five varieties	8 00
Ditto, collection apples, ninety varieties	10 00
Ditto, collection pears, thirty-five varieties	10 00
Ditto, collection peaches, twelve varieties	10 00
Ditto, collection quinces, three varieties	3 00
Ditto, collection native grapes, forty varieties	10 00
Ditto, collection native grapes, six varieties	5 00
Ditto, largest exhibition, consisting of grains, seed, vegetables, and fruits	10 00

Class No. 26.—Beet and Sorghum Sugar Machinery.

Elias W. Carpenter, Harford, Pa., fifteen pounds maple sugar	$5 00

Class No. 30.—Vegetables.

E. F. Dawson, Abington Centre, Pa., twelve ears yellow corn	$1 00
J. Vadikin, Montrose, Pa., twelve red onions	1 00
W. Graves, Shickshinny, Pa., six squashes	1 00
Ira Tripp, Scranton, six pumpkins	1 00
Miss L. A. Lindley, Montrose, twelve beets	1 00
M. A. Catlin, Montrose, Pa., three Hubbard squashes	1 00
M. A. Catlin, Montrose, Pa., twelve ears yellow corn	1 00
Almon Stone, Waverly, Pa., twelve ears white corn	1 00
D. Langstaff, Scranton, twelve bunches celery	1 00
J. G. Rupp, Mechanicsburg, Pa., one lot peppers	1 00
Philip Hess, Harrisburg, Pa., six cantaloupes	2 00
Do ... do ... six pine apple cantaloupes	2 00
Do ... do ... six late drum head cabbages	1 00
Do ... do ... three mountain sweet melons	1 00
Do ... do ... six spine cucumbers	1 00
Do ... do ... five egg plants	1 00
Do ... do ... lot wine plants	1 00
Cumberland County Horticultural Society, twelve white onions	1 00
Do ... do ... do ... do ... three white turnips	1 00
Do ... do ... do ... do ... twelve radishes	1 00

Class No. 31.—Grapes, Cider, Cordials, etc.

J. Northrop, Clark's Green, Pa., best half-peck Concord grapes	$2 00
Tildie Bardell, Pittston, Pa., best half-peck Catawba grapes	2 00
Adam Gerbig, four bunches Concord grapes	1 00
Do..........do......Delaware grapes	1 00
Do......collection of grapes, foreign or domestic	3 00
Dr. R. A. Squire, Scranton, display foreign grapes	5 00
H. B. Rockwell, Providence, Pa., display foreign varieties	10 00
S. B. Mackson, West Lenox, Pa., fifteen varities grapes	10 00
Mrs. Gabriella J. Breck, three bunches (foreign collection) grapes,	3 00
J. Northrop, Clark's Green, blackberry wine	2 00
Frank Bossard, Scranton, elderberry wine	1 00
W. Babtista, Waverly, Pa., three bottles cider	3 00
B. Willhouser, Scranton, cider vinegar	2 00
F. Schrader, Scranton, two dozen root beer	1 00
Cumberland County Horticultural Society, display of home-made wines	Diploma.

Class No. 32.—Fruit.

M. L. Catlin, Montrose, Pa., ten fall varieties apples	$5 00
C. J. Hollister, Susquehanna county, ten fall varieties apples, second best	3 00
Isaac Tripp, Kingston, Pa., five winter varieties	5 00
Rev. Isaac Bevan, Clark's Green, second best	2 00
John Hollgate, Clark's Green, best arranged basket apples	6 00
John Watts, Ithaca, N. Y., best and largest collection apples	10 00
Charles Parker, Waverly, Pa., second best	5 00
Lindley & Brown, Scranton, collection pears	Diploma or 10 00
John Watts, Ithaca, N. Y., second best	$5 00
B. Morris Ellis, Hughesville, three varieties quinces	3 00
Lindley & Brown, Scranton, arranged basket quinces	5 00
B. Morris Ellis, Hughesville, best general assortment of fruits, all kinds	10 00
Joseph Schmidt, Harrisburg, new seedling peaches, (Bismarck,)	1 00
Miss Byron Winton, Providence, lemon tree in fruit	2 00

Class 33.—Flowers and Designs.

Mrs. Mary Loucks, Hyde Park, one large cactus	$2 00
Mrs. W. W. Winton, Providence, rustic stand and plants	5 00

Mrs. W. W. Winton, collection flowers	$2 00
Mrs. W. W. Winton, hanging basket	2 00
Mrs. G. W. Miller, Providence, English ivy	2 00
Mrs. G. W. Miller, jasmines	1 00
Mrs. Julia Lamb, Scranton, Jerusalem cherry tree	1 00
Mrs. S. D. Kingsley, Hyde Park, two boquets	1 00
Mrs. Alice G. White, Scranton, hanging basket	2 00
Miss Julia Pierce, Providence, fuschia	2 00
Mrs. W. W. Winton, Providence, two boquets	2 00
Mrs. Dr. John Foot, Archbald, one phantom boquet	3 00
L. H. Noviock, Harrisburg, new specimen of plants	2 00
L. H. Noviock, variegated leaf plants	5 00
L. H. Noviock, nurseryman's collection, second premium	5 00
L. H. Noviock, collection of pinks	2 00
L. H. Noviock, licopodderums	2 00
H. R. Noll, Scranton, nurseryman's collection, first premium	10 00
Mrs. A. H. Noll, Scranton, vase verbenas	2 00
Mrs. A. H. Noll, roses and carnations	2 00
Mrs. H. B. Rockwell, Providence, amateur's collection, superior,	2 00
Mrs. H. B. Rockwell, Providence, basket dahlias, &c	2 00
Mrs. Stanley Woodward, Wilkesbarre, fancy basket of cut flowers,	2 00
Mrs. J. C. Platt, Scranton, two vases flowers	2 00
Mrs. J. C. Platt, oleander	1 00
Mrs. Garland, Providence, cerlinea, (wax plant)	2 00
Mrs. H. B. Rockwell, Providence, two hand boquets	3 00
Mrs. Byron Winton, Providence, lemon tree	2 00
Miss Jennie Albright, Scranton, floral design	3 00

CLASS NO. 34.—STOVES AND TINWARE.

Leonard Brothers, Scranton, cook stove, America, (for coal)	Medal.
Scranton Stove Co., cook stove for coal and wood, (Merry Christmas)	Medal.
Scranton Stove Co., range, Excelsior, recommend	Medal.
Scranton Stove Co., sample hollow ware	$2 00
Maloney, Pratt & Co., Scranton, brick set range	Medal.
Maloney, Pratt & Co., ornamental parlor stove, Brilliant	Medal.
Hunt Bro., Scranton, Morning Glory furnace	Medal.
H. O. Silkman, Providence, best hall stove	Medal.
J. C. Gerhart, Scranton, sample iron railing	$5 00
C. H. & W. C. Doud, Scranton, grates for open fires	5 00

Class No. 35.—Glass, Cutlery, &c.

Thomas Slate & Co., Bloomsburg, Pa., display of slate mantles, table tops, checker boards	Medal.
H. B. Blackman, Wilkesbarre, spring beds and mattresses	Medal.
Lother and Tyson, Pittsburg, improved non-explosive lamps and oils	Medal.
Hull and Shopland, brooms	$1 00
Hull & Shopland, tubs	1 00
O. O. Bowman, Trenton, N. J., collection terra cotta ware	Diploma.
Scranton Soap and Manufacturing Company, castile soap	$1 00
Do...do...do...do...family soap	1 00
Do. .do...do...do...chemical soap	1 00
Do...do...do...do...olien soap	1 00
Do...do...do...do...transparent soap	1 00
Do...do...do...do...ball soap	1 00
Mrs. W. W. Winton, Providence, one toilet set	2 00
Bachman, Clewell & Co., Freemansburg, Pa., four boxes soap	Bronze medal.
Dorflinger Glass Company, White Mills, Pa., collection glass ware	Bronze medal.
Corwin & Sons, Providence, extension table	Diploma.
E. Ferler, Scranton, patent wash boiler	Diploma.
Van Horn & Bro., Hunlock's Creek, one dozen chairs	Diploma.

Class No. 36.

Mrs. A. G. Hollister, Brooklyn, Pa., rag carpet	$5 00
J. A. Bunnell, Montrose, home-made linen	3 00
Mrs. O. N. Tiffany, Montrose, domestic blankets	5 00
Mrs. O. N. Tiffany, Montrose, plain flannel	5 00
Mrs. Geo. Frantz, Carverton, woolen cloths	5 00
Lydia Crooker, Montrose, plain linen	2 00

Class No. 37.

Mrs. O. B. Wright, Scranton, silk sofa cushion	$1 00
Mrs. J. G. Babcock, Montrose, silk quilt	1 00
Mrs. Dr. Lathrop, Montrose, silk quilt, (2,500 pieces)	3 00
Mrs. F. C. Staddell, Dickson, chair cover	1 00
Miss Grace Himrod, (12 years,) Scranton, fancy dress	2 00
Mrs. Bryden, Providence, night dress	2 00

Mrs. J. M. Mills, Scranton, shirt made by hand	$2 00
Miss A. P. Teal, Providence, calico spreads	1 00
Mrs. J. C. Phelps, Scranton, white counterpanes	2 00
Miss A. W. Morris, Scranton, toilet cushion	2 00
Mrs. J. A. Scranton, Scranton, sofa pillow	1 00
Mrs. E. Mulford, Scranton, embroidered shawl	2 00
Miss Alice Burr, Carbondale, one chemise yoke	1 00
Mrs. Lucinda Gardner, Scranton, coverlet	2 00
Miss Gertie Tripp, Scranton, linen cambric handkerchief	2 00
Mrs. Lucilie Silkman, Scranton, velvet chemille slippers	1 00
Mrs. G. L. Dickson, Scranton, embroidered chair	3 00
Miss May Hill, Harford, Susquehanna county, worked collar	2 00
Miss Kate Cummings, (aged nine years,) Harford, woolen stockings	1 00
Miss Ella Merrimen, Montrose, calico spread, (3,000 pieces)	2 00
Mrs. O. N. Tiffany, Montrose, bed quilt	2 00
Miss L. Stevens, Scranton, embroidered slippers	1 00
Mrs. E. Stark, Scranton, delaine quilt	1 00
Miss Polly Stevens, Blakely, bed quilt	1 00
Miss Paxton, West Chester, worsted work	1 00
Mrs. A. Frothingham, Scranton, baby dress, hand made	1 00
Mrs. G. L. Dickson, Scranton, embroidered chair	3 00
Mrs. C. H. Welles, Scranton, flannel embroidery	2 00
Miss Susan Liesenring, Northumberland county, embroidered skirts	1 00
Miss E. Eiseman, Scranton, pair of knit stockings	1 00
Mrs. J. C. Morris, Scranton, one knit spread	3 00
Mrs. Polly Parnell, Hyde Park, (eighty years old,) woolen rugs	1 00

Class No. 38.—Knitting, Crochet and Shell Work.

Mrs. W. C. Dickinson, Scranton, knitted shawl	$2 00
Mrs. C. H. Doud, Scranton, crochet shawl	2 00
Mrs. Dr. Lathrop, Montrose, cotton tidy	1 00
Miss Jennie Albright, Scranton, best zephyr	1 00
Miss Ella M'Cune, Scranton, knitted sontag	1 00
Mrs. E. S. Reed, Scranton, knitted hood	1 00
Miss Gertie Tripp, Scranton, afghan	2 00
Miss Lizzie Tripp, Scranton, crochet slippers	1 00
Mrs. A. M. Vadikin, Montrose, best display of crochet work	2 00
Mrs. A. H. Mathews, Providence, best display knitted work	2 00

Miss Mary Devine, Scranton, best crochet single article	$1 00
Mrs. M. H. Harrington, Montrose, best knitted single article	1 00
Mrs. Hannah Welles, best display tatting	2 00
Mrs. George L. Dickson, Scranton, best display wax work	2 00
Mrs. Spafford Barber, Carbondale, display of burr work	2 00
Mrs. Winton, Providence, second display burr work	1 00
Mrs. G. W. Miller, Providence, single specimen burr work	1 00
Mrs. M. Root, Providence, display seed work	2 00
Miss E. T. Rank, Scranton, single specimen seed work	1 00
Messrs. John Wall & Co., Scranton, best display of hair work	2 00
Mrs. B. A. Worden, Scranton, second best display of hair work	1 00
Mrs. Brandon, Dunmore, single display hair work	1 00
Mrs. Spafford Barber, Carbondale, display of shell work	2 00
Mrs. Winton, Providence, second best display shell work	1 00
Mrs. H. A. Hutchinson, Hyde Park, single specimen shell work	1 00
W. H. Freeman, Hyde Park, design in moss	2 00
Mrs. J. C. Platt, Scranton, collection of sea weeds	1 00
Miss Hattie M'Pherran, Millersburg, Pa., wax cross	2 00
Mrs. S. D. Kingsley, Hyde Park, second best wax cross	1 00
Mrs. J. C. Richards, wax fruit	1 00
Miss Lizzie Chase, Carbondale, best display of wax fruit	2 00
Miss Alice Frothingham, Scranton, second best display wax fruit,	1 00
Miss Mary Evans, Wilkesbarre, wreath flowers, (feathers)	2 00

Class No. 40.—Preserves and Spiced Products.

Mrs. J. P. Kast, Mechanicsburg, Pa., display of jellies	$5 00
Mrs. W. H. Perkins, Scranton, preserved peaches	1 00
Mrs. W. H. Perkins, Scranton, preserved strawberries	1 00
Mrs. J. C. Morris, Scranton, apple jelly	2 00
Mrs. Okley, Providence, quince jelly	1 00
Mrs. W. H. Perkins, Scranton, currant jelly	1 00
Mrs. H. A. Longsdorff, Mechanicsburg, best display of canned fruit	5 00
Mrs. C. A. Stevens, Scranton, second best display canned fruit	3 00
Mrs. Henry Leach, canned peaches	1 00
Mrs. H. A. Longsdorff, Mechanicsburg, Pa., canned quinces	1 00
Mrs. H. A. Longsdorff, canned cherries	1 00
Mrs. H. A. Longsdorff, canned tomatoes	1 00
Mrs. Dr. Hollister, Providence, canned corn	1 00
Mr. Tunis J. Thomas, Hyde Park, mixed pickles	1 00

Class No. 41.—Fine Arts and Penmanship.

Mrs. Sarah Schreiber, Scranton, best display oil paintings..	Silver medal.
Mrs. U. G. Schoonmaker, Scranton, second best display oil paintings	$3 00
Mrs. U. G. Schoonmaker, Scranton, best display oil portrait	3 00
Miss Meredith, Scranton, second best display oil portrait	2 00
Mrs. S. Schreiber, Scranton, landscape painting, oil	3 00
Mrs. E. A. Heath, Scranton, best fruit painting, oil	3 00
Miss Mary Marple, Scranton, game scene, in oil	3 00
Miss Mary Marple, Scranton, landscape and water color	3 00
Miss Mary Marple, Scranton, single specimen colored crayon	2 00
Miss Sarah Schreiber, Scranton, flowers in water color	3 00
Mrs. Theodore Smith, Montrose, best display of water colors	3 00
Mrs. A. Barney, Scranton, display colored crayons	3 00
Miss E. J. Hawley, painting of crayon drawings	3 00
Miss Ella Wilcox, Scranton, second best painting of crayon drawings	2 00
Miss Ella Pinkerton, Scranton, portrait in crayon	1 00
Miss E. J. Hawley, pair crayon medallions	2 00
Miss Anna Morris, Scranton, pair of pencilings	2 00
Master James Culver, Scranton, pencil drawings	1 00
Master Isaac Post, Scranton, pencil drawings	1 00
Mrs. G. W. Miller, Providence, monachromatic drawing	2 00
J. M. Gibbs, display pen drawing, single specimen pen drawing, ornamental penmanship	Diploma.
Miss Minnie A. Sower, Scranton, second best display pen drawings,	$2 00
Mrs. O. A. Linsey, Montrose, second best single specimen pen drawing	2 00
Mr. C. H. Chandler, Scranton, best plain penmanship	1 00
M. May, Scranton, best carving, (marble)	3 00
Geo. Maddicks, Scranton, best carving of stone	3 00
J. S. Back, Scranton, specimen wood graining	3 00
Frank Jewell, Scranton, best display photographs	Bronze medal.
M. L. Alexander, Scranton, best display of chromos and oil paintings	$5 00
Mrs. T. Smith, Montrose, best autumn leaves, (water colors)	2 00
J. F. Randolph, Scranton, medley, collection heads	2 00
Mrs. H. A. Allen, Scranton, oil painting with figures	3 00

Class No 43.—Unclassified Entries.

Tanite Company of Stroudsburg, one emery grinder, No. 1, one emery grinder, No. 2, one emery grinder, No. 3, one saw gummer, one pair patent flanges, emery wheels and oil stones. Diploma for the lot.

John Maclaren, Scranton, display of nickle plated. Diploma if manufactured by him.

Finch & Co., Scranton, display of iron castings for buildings. Diploma.

Enoch Morgan's Sons, New York, diploma for sapolio and family soap.

American Fence Co., Cleveland, sample of wooden fence. Diploma.

R. N. Bowman, Mifflinville, Columbia county, patent silent mill feeder. Diploma.

Garney, Tripp & Co., Scranton, one case of cigars. Diploma for manufacturing.

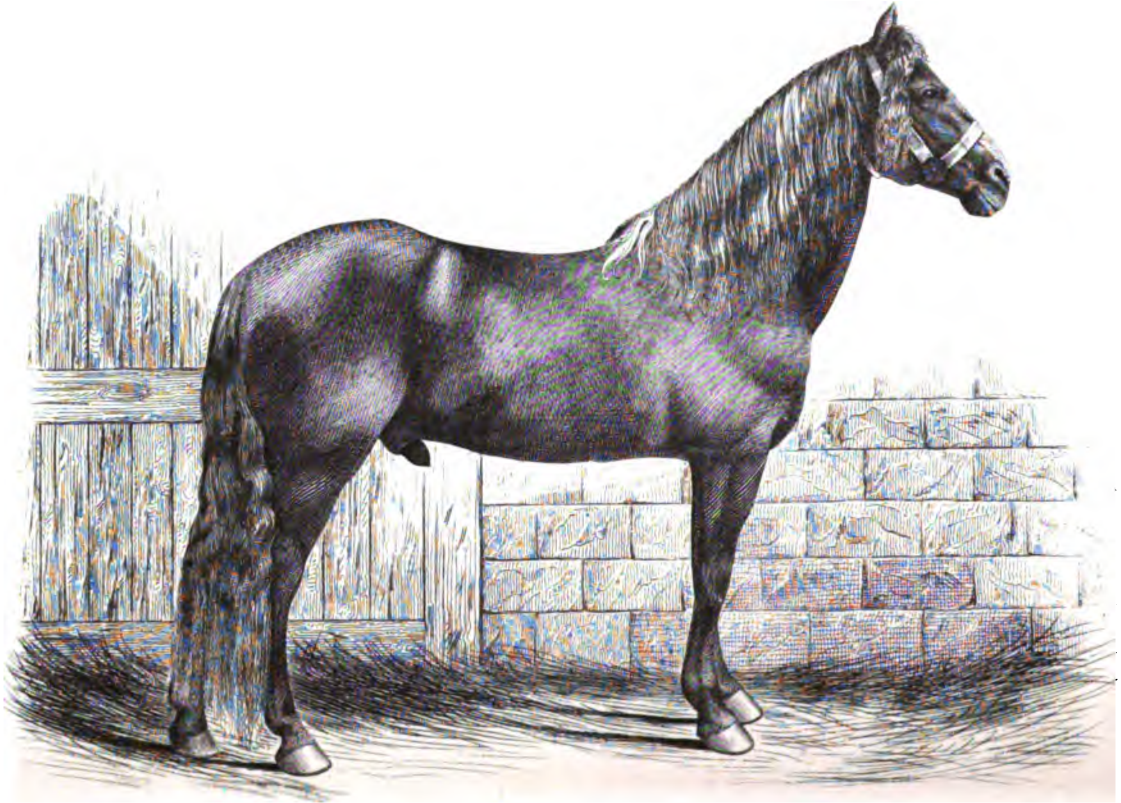
Hunt Bros., Scranton, two milk cans, premium	$2 00
Bailey & Co., Philadelphia, two and two and one-half bushel seamless cotton bags	Diploma.
Bailey & Co., Philadelphia, three bushel seamless cotton bags	Diploma.
H. Sherman, Waverly, Pa., one earth closet	Diploma.
I. S. Wachob & Co., Scranton, two terrestial globes	Diploma.
I. S. Wachob & Co., Scranton, two school desks and seats combined	Diploma.
W. H. Seacord, Bailey, Webb's adding machine	Diploma.
Maplon Hamlin, Catawissa, one saw shield and table	Diploma.
W. B. Culver, Scranton, patent safety carriage for mines	Diploma.
Wm. Taylor, Jersey City, display of fancy soap	Diploma for toilet soap.
D. Philip Griffin, Scranton, display of dental work	Diploma.
J. J. Palmer, Pittsburg, one patent soldering furnace	Diploma.
J. J. Palmer, one patent soldering iron heater	Diploma.
L. C. M. Richardson, Waverly, five cases natural history	$10 00
M. LaMar, Scranton, one case fine stuffed birds	Diploma.
Gregory & Snover, Scranton, best display of cigars	Diploma.
E. A. Owen, Windon Centre, two patent hand looms	Diploma.
Hunt Bros., Scranton, one funnel fruit jar filler, premium	$2 00
Louther & Tyson, Pittsburg, W. W. Tyson's patent vapor burner, M. Stewart's	Diploma.
J. B. Munson, Bailey Hollow, patent bed clothes holder	Diploma.
Hobart, Sash & Blaird, threshing machine and grain cutter, Binghamton, N. Y	Diploma.
J. F. Brundage, Corry, Erie county, one patent adjustable ironing table	Diploma.
S. W. Kintz, Scranton, specimen of screen work	Diploma.
John S. Yinger, Mount Wolf, Pa., patent horse hay fork	Diploma.

Dr. H. Hollister, Providence, case specimens of Indian relics of Lackawanna valley	Diploma.
William Thurston, Pittsburg, washing machine and wringing combined	Diploma.
W. S. Best, Scranton, churn with butter separating attachment	Diploma.
Abel Barker, Scranton, machine for opening and re-sealing fruit cans	Diploma.
—— Balding, Wheeling, Va., one patent pump	Diploma.
W. M. Congers, Newark, N. J., thirty trays	Diploma.
C. H. & W. G. Doud, patent miners' lamp and attachment for raising wick	Diploma.
Maloney, Pratt & Co., one submerged pump	Diploma.

HORSES.

BY ELLWOOD HARVEY, M. D., OF CHESTER.

The value of the horses of a State is not properly estimated by census reports, nor by any assessment of their value in dollars and cents. Whether the horses of Pennsylvania are worth ten million or a thousand million dollars may be a matter of some interest for certain purposes, but to have a just conception of the value of these servants and friends of man, they should be considered in their relation to our daily happiness, and our daily dependence upon them for much that we enjoy. To horses, far more than to any other domesticated animal, is due the present advanced state of our civilization. Just in proportion to the seclusion of a tribe of people from intercourse with others is their barbarism; and on the contrary, whatever promotes personal intercourse and the interchange of ideas among men advances civilization. History is full of the evidence of this. In Asia the human race emerged from the lowest barbarism, in those places where it was crowded into dense populations by surrounding seas and mountains, as in China and Hindoostan, and where, of necessity, there was increased freedom of personal intercourse. In Africa, Egypt, surrounded by seas and deserts, and affording great facility of intercourse by means of her wonderful river, the Nile, became the seat of a high civilization. In the islands and peninsulas of Greece, and of ancient Rome, where similar conditions existed, were witnessed similar results. When our race had developed to a certain point, some means of locomotion greater than nature had endowed man with became



[illegible] ALLEN.

Owned by GEN. JOHN F. HARTRANFT Norristown Pa. Awarded 1st Premium at Exhibition of [illegible]

an absolute necessity to any further advancement toward civilization. At this point the horse supplied the want, as no other animal on the earth could have done. The docility with which he learns and obeys the will of his master, the courage with which he bears him into battle, the endurance with which he drags the stage-coach over ill-made roads, the speed with which he carries the courier from post to post, the patience with which he complies with all the various demands upon his strength in agriculture, the ardor with which he participates in the chase and the race; his affection, his peaceful disposition, his freedom from all resentments, his unresisting obedience to the most exacting, and even cruel, requirements of his sometimes brutal master, are all powers, faculties and graceful adornments of character, such as cannot be found combined in any other animal whatever. These were the qualities that filled the requirements of advancing civilization; these the means of increased wealth, comfort and culture at home, and of enlarged personal intercourse and increased interchange of ideas with those abroad. It may be even a reasonable supposition that the savage nature of the primitive man was directly influenced for good by the example of his humble servant—the sympathetic influence of his gentle companion.

Without horses, perpetual semi-barbarism would seem to have been the highest destiny of man upon the earth. It was necessary to the attainment of railroads, steamboats and telegraphs, which have somewhat superseded the employment of horses for rapid conveyance, that the horse should first perform his mission. A certain degree of human progress had to be reached before these things were possible, and never would have been reached without horses.

It is not necessary to dwell upon the importance of horses to our wealth and comfort in the present day. Their universal employment in purposes of both business and pleasure, the high esteem in which they are held, the affection with which they are cherished by those who are capable of appreciating them, all speak sufficiently upon this point.

It has been for some years past assumed, and generally admitted, that the horses of Pennsylvania are a large and strong variety, fit only for slow and heavy draft, and they have been named Conestogas. When the only means of transportation of heavy goods, between the waters of the Delaware and the waters of the great Mississippi valley, were large wagons, drawn by teams of five to seven horses, between Philadelphia and Pittsburg, large animals were in demand, and the size of our farm and draft horses was probably increased by that fact, particularly along the route between those two cities. The Conestogas are a very remarkable breed of horses that never had any existence in this State, nor out of it, except in somebody's imagination, who invented the fiction, and in the credulity of those who believed it.

The chief European source of our supply was England, from where we derived both the elegant Thoroughbred and the more common draft horse. Lower Canada was stocked with horses from France, and a few of these, generally called Canadians, and sometimes Cannucks, have been brought here, and have slightly marked their mixed descendants with their peculiarities, but they have not materially modified our stock. Some of the southern States and Mexico were stocked with horses from Spain, and their descendants are generally known as Mustangs. Very few of them have ever reached us, and they have made no mark on the character of our stock. Occasionally a horse has been brought into the State from Arabia, but they have not visibly modified our stock of horses.

Our finest bred horses, those that minister most to our pleasure and necessities as road horses, are derived mainly from the English Thoroughbred, and a few words may not be amiss in explanation of what is meant by that term. About two hundred years ago racing became a popular amusement in England, and the finely bred, light-limbed, long-winded, spirited horses of Arabia, Turkey and the Barbary States, were imported to that country for stud purposes. Some were also imported from the south of Spain, called Andalusians. These were a cross of the Barbary horses, taken there by the Moors, who long held possession of Spain, on the native Spanish horses, and were about the best horses then known in the world.

From these several sources was developed the thoroughbred English race horse, which is the breed always meant by horsemen when they speak of a Thoroughbred. By judicious breeding from the best, from those that proved themselves most speedy and lasting on the turf, the English racer was soon superior to any of the oriental horses whence he was derived, and this is true of the Thoroughbreds to this day, both in Europe and in America. No further advantage is likely to be obtained from any importation of oriental horses into either England or the United States.

Though called thoroughbred, these horses were not derived purely from the horses of the East, as the name was intended to imply; but it is well known that the native horse of England was not kept entirely out of the breed. Though the excellence of these horses is primarily due to their eastern ancestry, and though this excellence was enforced, improved and perpetuated by judicious breeding, it is probable, for reasons which will be stated when speaking of the principles of breeding, that the infusion of native blood was no disadvantage to the English Thoroughbred.

Whatever his origin, he is the handsomest, speediest, most enduring and every way the most elegant of horse kind on the earth. Of course there are many specimens that are wide exceptions to the rule, but the rule holds good notwithstanding, and the Thoroughbred is, therefore, a source of certain qualities which breeders are every day learning more and more to appreciate, and to draw from in the breeding of horses for other purposes than racing.

The term "Blooded" is also frequently used to designate this particular breed of horses. A full-blooded horse, means a Thoroughbred, unless the expression is qualified. Thus we say a full-blooded Canadian, or a full-blooded Percheron, but commonly it is meant that a blooded horse, or a full-blooded horse, is a Thoroughbred.

The engraving of the imported stallion Leamington, presents a specimen of the highest type of the Thoroughbred. He is a brown horse, foaled in 1853, bred by Mr. Halford, England, got by Faugh-a-Ballah, dam by Pantaloon. He was imported in 1869 by Mr. R. W. Cameron, of New York, and is now owned by Mr. A. Welch, of Chestnut Hill, near Philadelphia.

His get are among the fastest running horses of their ages in this country, and his importation was an event of immense interest to those breeders who are particularly interested in running stock. He is probably the best racing foal getter in the country, if not the best in the world. It must not be inferred from what has just been stated, that the common horses of the State are the opposite in quality to the Thoroughbreds, nor that all excellence is to be found only in this particular breed. The truth is that nearly all of the horses used for road purposes at light draft, are strongly infused with the Thoroughbred blood, and owe much of their excellence to that fact. It is also true, that for heavy draft, a larger, heavier, stronger horse is superior to the Thoroughbred, and may be, in his proper place, as handsome, as useful and as satisfactory in all respects as the more highly bred horse is in his proper place. To meet the demand for animals capable of taking a great load at a good pace, there have been recently introduced into the State, a breed of horses from the northern part of France, called Normans, and also called Percherons. The original Norman horse, as found in France, was large and somewhat slow and heavy in action. When the Spanish occupied the Netherlands, they took there the Andalusian horses from their own county, and these crossed with the Norman, produced an animal of more spirit and action, and being particularly bred in the French province of Perche, the improved Norman received the designation of Percheron. It was with these that Lower Canada was stocked when it was first settled by the French; and the Cannuck is a Percheron dwarfed by the rigor of the climate, and the scanty fare of a country where the winter is longer than the summer. The first Percherons imported to this country were brought to Moorestown, New Jersey, about the year 1840, by Mr. Edward Harris, who thought he could produce first-rate horses of all work, and stylish carriage horses, by breeding Percheron stallions on New Jersey mares. The attempt was a dead failure, and Mr. Harris in 1850, wrote as follows: "So far from considering these horses as capable, by any crossing, of producing the very best of horses for all purposes, that is to say the best horse-of-all-work, I believe that if I had my time to live over again, had a very large landed estate and an unlimited supply of '*the dust*,' I could produce that horse by breeding from the thoroughbred English racer." This is a remarkable confession, coming as it did from one who had staked his money and his reputation as a judge of horses, upon the attempted result. The candor of the statement is worthy of all praise, and we should not fail to profit by it.

It must not be inferred that the importation of this very valuable breed of horses was useless, but only that their best use was not understood by Mr. Harris. He attempted to produce a result, by crossing breeds, which could not be so produced. The greatest value of Percherons is best secured by keeping the breed pure, or as nearly so as practicable. The half-bred descendants of Percheron sires should be bred back to the same stock, (not to the same sire, however,) and the resulting three-quarters bred produce should be again bred back to the pure Percheron stock. By this method, and by a judicious selection of native mares to begin with, we may quite rapidly and surely increase the Percherons to any extent desired.

Mr. Harris says of them: "These horses first came under my observation on a journey through France, in 1831. I was struck with the immense power displayed by them in drawing the heavy diligences (stage coaches) of that country, at a pace which, though not as rapid as the stage-coach traveling of England, yet at such a pace, say from five to nine miles per hour, the lowest rate of which, I do not hesitate to say, would, in a short time, kill the English horse if placed before the same load." An English writer, in the *British Quarterly Journal of Agriculture*, says: "The horses of Normandy are a capital race for hard work and scanty fare. I have never seen such horses at the collar. They are enduring and energetic beyond description. With their necks cut to the bone they flinch not. They keep their condition when other horses would die of neglect and hard treatment."

The engraving of Prince Imperial represents very accurately the conformation and style of this breed of horses. He is a gray stallion, 15½ hands high, was imported by W. T. Walters, Esq., of Baltimore, Md., and is now owned by J. Donald Cameron, Esq., of Harrisburg, Pa.

The United States and Canada have, for somewhat less than fifty years, given attention to trotting as an amusement; and from small beginnings this has grown to be, particularly in this country, the most exciting amusement of a large class of people, and has made the raising of trotters the most profitable part of horse breeding. The prices of fast trotters range from a few hundreds up to many thousands of dollars, according to the speed of the animal. From three to twenty thousand dollars embraces the scale at which most of those are sold that are fast enough for public racing; and the prices that have been paid for trotters for private driving are even greater, reaching to fifty thousand dollars, and upward. Whether these prices are likely to continue for any considerable length of time is a question of much interest to horse breeders, and deserves, therefore, thoughtful consideration.

Both in England and in this country the thoroughbred has been used chiefly for public racing; and though his usefulness for most other purposes was less than that of common horses, the prices of good thoroughbreds have always been above those of the common stock. This difference was, clearly, due to the public interest felt in the exciting amusement of horse racing. That this interest continues, and will continue, is beyond a doubt. In this country it has been transferred from running to trotting matches to a great extent, and there are several strong reasons for believing that it will not only not diminish, but that it will increase in even greater degree than the increase of population. Here are some of the reasons for that belief: Whereas, in running matches the horses all belonged to a very few individuals, and they of a class separated from the mass of people by great wealth, which enabled them to own a large stud of horses not used for any other purpose; therefore, the general interest could not be so great as in trotting matches, in which tens of thousands of men are interested because themselves own trotters of more or less speed. Again, runnning horses have very little value for other purposes; but trotters are, for daily use, the most valuable of all horses. For all purposes of road travel, except heavy draft, the trotter is the horse.

Saddle horses are yearly decreasing in demand. Better roads, with lighter and more numerous carriages, have rendered the well-gaited saddle horse almost unnecessary; and for quick work in harness, trotting is the only gait desired. It may be said that for all ordinary road use, a horse that cannot trot better than a mile in five minutes, is as good as one that can do it in two and a-half, but this is not true. The fast trotter, other things being equal, is much the better horse. He can do his mile in five minutes at a gait that to him is an easy jog, but the other must exert himself to his utmost to go as fast. And then, we all want to go faster than a five-minute gait sometimes. For pleasure driving, fast trotters will always command high prices. There is no pleasure in going slowly, except when we know that we could go faster if we wanted to. A good trotter may be the most useful business horse, as well as the most delightful pleasure horse. The same qualities that constitute one, may be, and generally are required for the other. There will always be a large demand for just such horses. The demand for running horses has always been from a very small class of purchasers, yet their prices kept at high figures always. How much greater then must be the demand, and how much higher the prices, for horses that so fully meet the requirements of the largest class of purchasers. The running horse affords his owner pleasure only a few times in a year; the trotter can be enjoyed every day when business or pleasure calls his owner upon the road.

Beside the very numerous class of buyers alluded to for fast trotters, there is another of nearly equal importance to the breeder, and that is composed of those who make a business of training and driving fast trotters for public amusement. Trotting races are now as thoroughly established in this country, as a national amusement, as running ever was in England, where it has steadily increased for nearly two hundred years, as trotting will here forever. The cultivation of thoroughbreds was the means of immense improvement in the general horse stock of England and the United States. The cultivation of trotters will prove to be a still more valuable means to the same end. In the first place, the first-class trotter is exactly the best horse for many uses, which can not be said of runners. Many fast runners are absolutely worthless for all general use, which cannot be said of trotters. Thoroughbreds are trained and run at two, three and four years old, and nearly all races are run by horses of these ages. Many of those most distinguished on the turf break down with lameness, blindness or broken-wind at these early ages, but are put in the breeding stud with very little regard to their defects, speed being all that is bred for in that class of horses. Their progeny inherit a tendency to the defects of their progenitors, and, after a few races, go off the turf with the same diseases and defects. These are not much regarded, for their racing days are over, and they are followed by another lot of youngsters, who, in turn, have their brief career of one to three years, during that period of their lives which precedes the manifestation of hereditary diseases. As illustration of this, it may be mentioned that the most fashionable strain of running horses, for several years preceding the importation of Leamington, was of a miserably blind stock, some of them being foaled blind, but most of them can see for a few years—long enough to answer racing purposes. With trotters the case is of necessity different and better. Most of them are not used exclusively for racing, and the demand is for the very best of horses in all respects, trotting fast included. And then trotters do not come to the maturity of speed until they are over ten years of age, and this fact, together with the years of practice and training they must stand before their highest powers are developed, insures the existence of the very best of constitutions in all respects. The cultivation of trotters can not fail to be one of the very best means of improving our stock of horses in soundness and longevity, as well as in usefulness for most of the purposes for which horses are required. Flora Temple, after acquiring a world-wide renown as a trotter, retired to the breeding-stud as sound as a bullet, and without even the blemish of a wind-gall, at twenty-three years old, and having produced three colts, is still breeding. The same *might* be true of many running mares, but something of this kind of constitution *has* to be true of distinguished trotters; and thus it is that the training of trotters becomes a thorough test by which we are enabled to discriminate the very best, and to use them for breeding purposes.

So many erroneous notions are prevalent about the origin of fast trotters that it may be well to state briefly what is known upon the subject. It is not true that trotters may all be made fast by training, though all may be improved by it. It is not true that fast trotters are generally chance horses of any breeding, and often picked up out of carts and other laborious work. It is not true that there is no certainty in breeding for fast trotters, and it is probably not true that any fast trotter was ever known that did not belong to a family noted for that quality, though it is common enough for the pedigree to be unknown.

The truth is that there are certain families of fast trotters in this country from which all are derived; that these families are derived from a few individual horses, which will be presently mentioned; that the laws of hereditary descent apply to the breeding of fast trotters as certainly as black children are born of black parents, and game cocks are not bred from Shanghai roosters. It would seem unnecessary to insist on such obvious truths if there were not a very prevalent belief in the public mind that trotting is not a natural gait, and that fast ones are liable to turn up by any kind of unnatural chance among all kinds and breeds of horses. Trotting *is* a natural gait, though not the fastest natural gait of a horse, just as walking is.

The principal source of the quality now under consideration was the thoroughbred horse Imported Messenger, brought to this country about eighty-five years ago. He was the great fountain-head of American trotters. The full history of this remarkable horse and of his descendants would make a most interesting book to all horsemen, and it is very gratifying to know that we may hope to soon have it from the pen of one of the most accurate historians of American horses, Mr. J. H. Wallace, of Muscatine, Iowa, author of the American Stud Book of Thoroughbreds and of the American Trotting Record and Register.

Another imported thoroughbred, Diomed, brought here when 22 years old, has many trotters among his descendants, but it cannot be shown that any of them take their speed entirely from him. It is certainly true that the Diomeds have made the best cross with the Messengers, and it is very probable that in the process of infusing more Thoroughbred blood into our trotters, which breeders are now doing, the Diomed blood (and some of our Thoroughbreds are rich of it) might be resorted to with great advantage. It is also claimed that the imported Thoroughbred Trustee added to the trotting quality of our horses, but the very few of his descendants upon which this claim is based all took their trotting from Messenger. An English horse, Bellfounder, also has some credit given him for begetting trotters. He was imported in 1823, and was not a Thoroughbred, though he showed good breeding.

Next to Messenger should probably be ranked a Canadian horse, Pilot, commonly known as Old Pacer Pilot. Wallace says of him:—"Foaled about 1826. Nothing is known of his blood. He was called a Canadian horse, and both trotted and paced. At the latter gait, it is said, he went in 2.26, with 165 pounds on his back. He was bought about 1832 by Maj. O. Dubois, from a Yankee pedler, in New Orleans, for $1,000. He was afterwards sold to D. Heinsohn, of Louisville, Ky., and was kept in that vicinity until he died, about 1855. His stock were very stout and fast."

The best of his descendants are the get of his son, Alexander's Pilot, Jr., a horse out of a mare of Diomed descent.

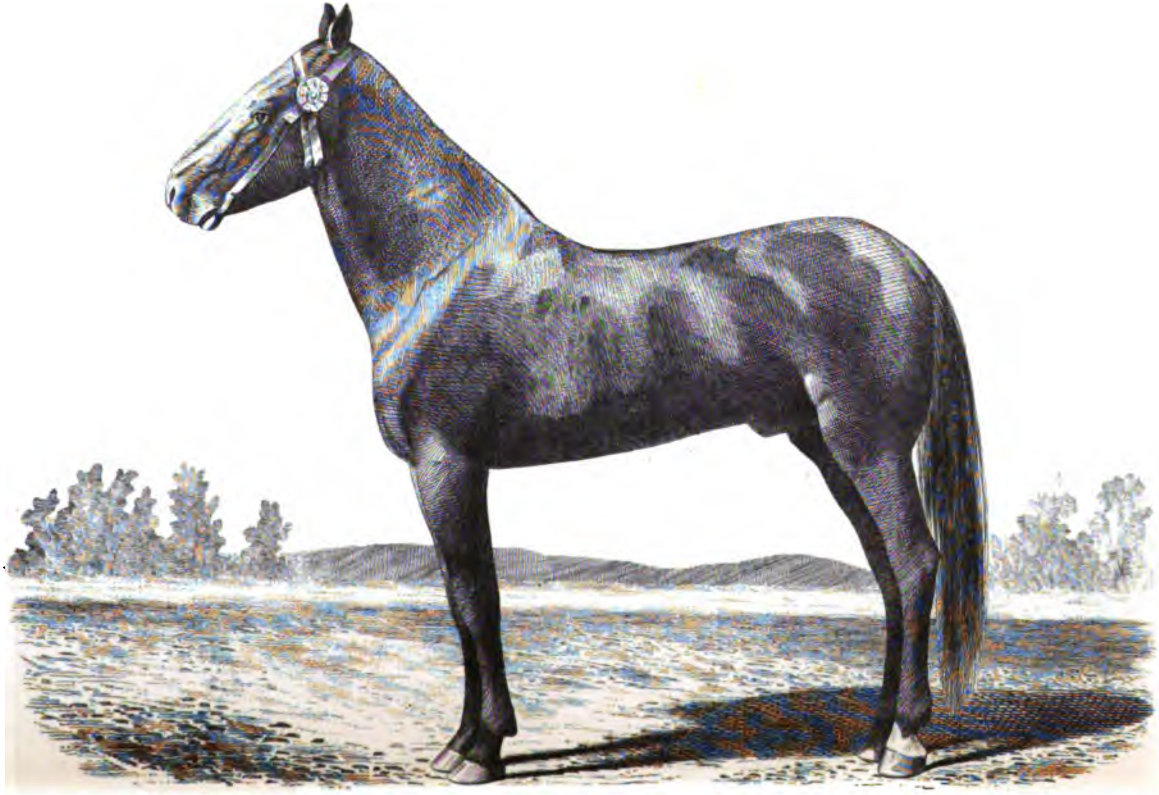
The trotting stallion, St. Lawrence, a Canadian, and Columbus, another of that stock; both left some good trotters among their descendants. The same may be said of several Canadian mares in this country.

It is thus seen that the quantity of fast trotting was not all derived from Messenger, but it is true, notwithstanding, that he was the principal source, and that he not only imparted the trotting to his get, but also gave them great powers of endurance. It is also seen that the original sources of trotting speed in this country are quite few; and it may be mentioned that there are no fast trotters in any other countries than the United States and Canada.

From these few sources, and almost from Messenger alone, have been derived several families, of which a brief account will now be offered.

The Hambletonians are the descendants of a horse foaled in 1849, and still owned in Chester, N. Y. He is distinguished from others of the same name, by the prefix of his owner's name, and is usually called Rysdyk's Hambletonian. He is five-sixteenths, or more than one-third of Messenger blood, and takes all of his trotting quality from that source, except the slight reinforcement offered by a dash of Bellfounder blood.

He is the sire of more fast trotters than any horse that ever lived. This fact is greatly due to the opportunities he has had, being in a part of the country where fast mares are abundant, and receiving the very best of patronage in that respect for the past fifteen years. He is the sire of Dexter, Geo. Wilkes, Socrates, Startle, Bruno, Brunette, Robert Bonner, Garibaldi, Aberdeen, Happy Medium, Manhattan, Volunteer, Gauntlet, Daniel Boone, and a great many more of celebrity.



SPEEDWELL HAMBLETONIAN

Owned by R.W. COLEMAN'S HEIRS Cornwall, Pa.

[illegible]

Hambletonian is a son of a horse almost equally renowned as a foal getter, Abdallah, a son of Mambrino, and a grand-son of Messenger. The engraving of Happy Medium gives a pretty good representation of the general appearance of the Hambletonians, but does not do justice to Happy Medium, as I have been assured by Dr. J. A. M'Crea, of Philadelphia, who knows him well. He says that the horse has more substance than the picture represents. Happy Medium's dam was the renowned mare Princess, the oft-time competitor of Flora Temple. Her sire was a descendant of Diomed through Duroc. Princess trotted in California on consecutive days, two ten mile heat races, both to wagons, in 29 m. 10¾ sec., and 29 m. 16¼ sec., winning easily the entire stakes, amounting to $35,000. Happy Medium trotted when six years old, at Patterson, N. J., and distanced the field in 2.32½. This was his last race, Mr. Galloway, who then owned him, believing he could make more money, with less trouble, by standing him for mares. Happy Medium is now owned by Mr. Robert Steel, of Philadelphia, and is the lord of the harem at Cedar Park, Mr. Steel's stock farm, near Philadelphia.

Speedwell Hambletonian is another of the same family, owned by the heirs of Robert Coleman, deceased, Cornwall, Lebanon county, Pa. (See engraving.) He is a bay stallion, sixteen hands high, out of a trotting mare of unknown pedigree, though she shows signs of high breeding.

The family of trotters next deserving notice, are the descendants of Mambrino Chief, a bay horse foaled in 1844, in Duchess county, N. York. He was taken to Kentucky in the winter of 1854, and died in 1861. Though never trained for matches, he trotted in a trial in 2.36.

Like Hambletonian, he, too, was a grand-son of Mambrino, the son of Messenger, so that these two families are not only both of Messenger descent, but also both come through his same son. Of the dam of Mambrino Chief nothing is known, except that she was a large brown mare, rather coarse, and was the dam of the trotter Goliah and of Mambrino Chief, the best two of their sire's get. Her trotting powers were never tested, and are therefore unknown. She has, of late, been spoken of disparagingly by writers interested in horses of other families. She has been described as coarse, plain, long-backed, lop-eared, without any appearance of good breeding, &c. Her plain appearance was no indication to her quality, but her produce was, and by that she must be judged.

The celebrated Dutchman was also a plain, coarse horse, of whom Frank Forrester (Henry William Herbert) wrote as follows: "He was a great, coarse, ugly, brown horse, with a short hog-neck, a fearful borer when going, with his head down, and his neck thrust obstinately out before him, and was in all respects about the most ungainly goer, and the most unpleasant horse to drive, I ever sat behind." Dutchman is judged by his performances, and particularly by his three miles in 7.32½, which has never been equalled.

Amazonia was judged by her produce. Wallace says: "She was coarse and plain, but had very fine trotting action, *and produced Abdallah.*" So let the dam of Mambrino Chief be judged. She was coarse and plain, her trotting action was never tested, but she produced Mambrino Chief and Goliah.

The fact that Mambrino Chief gave splendind trotting action to his get out of common mares, is proof enough of the good quality of his dam, for a horse must inherit any particular quality from both parents to enable him to transmit it with any certainty to his progeny.

Mambrino Chief's career as a trotting foal getter was confined to the period he was in Kentucky, which was only about six years, and the war commenced the year he died. When we consider the brevity of his opportunity to beget colts on good mares, and the political and martial commotion which interfered with the development of his get, many of them being forced into the army and destroyed, it is astonishing how great a reputation his descendants have made for him. Lady Thorn had no superior, not even Dexter. Her best three heats in one race being unequalled, and her best recorded one mile time being within one second of his. Others of his fast get are Mambrino Pilot, Bay Chief, Ericsson, Mambrino Patchen, Kentucky Chief, Ashland, Mambrino Prince, Mambrino Star, Mambrino Chief, Jr., Morgan Chief, and very many others.

The engraving of Dauphin represents a grandson of Mambrino Chief. He was sired by Woolfolk's Mambrino Pilot, (now called Alcalde,) dam by Hurst's Vermont, a son of Downing's Vermont, he by Hill's Black Hawk.

Dauphin was bred by Mr. A. Hurst, Woodford county, Kentucky, and purchased at three years' old for $1,000, by Joseph Montgomery, of Harrisburg, who now owns him. He is a bay stallion, sixteen hands high, and a very good specimen of the family.

Mambrino Pilot, a son of Mambrino Chief, is owned in this State by Mr. C. P. Relf, of Norristown, Montgomery county. He is, in all respects, a good stock horse, being the sire of a great many colts that have sold for high prices. He is a brown, over sixteen hands high, and trotted under saddle in 2.27½, at six years old, after spending three seasons in the breeding stud, in Kentucky and Iowa.

The Pilots have not been much introduced into this State, except that Mambrino Pilot's dam and Dauphin's grand-dam were both of that family. Old Pacer Pilot has been spoken of before as one of the few sources whence the quality of fast trotting was derived in this country. His family is best represented by his son, Alexander's Pilot, Jr. There are many good horses of this stock, bred chiefly in Kentucky, and one of them, Tattler, trotted in 2.26, at five years old, which is the best performance at that age on record.

A distinguished family of trotters that originated in Bucks county, of our own State, are the Bashaws. Their history is briefly as follows: In the year 1820, Joseph C. Morgan imported an elegant Arabian horse, of an iron-gray color, four years old, and fully fifteen hands high, from Tripoli. In beauty of form and of action, and in the power to transmit his own good qualities to his descendants, he was almost unequalled. Among the many mares bred to him happened to be one by First Consul, out of a daughter of Messenger. The offspring was a horse, named Young Bashaw, and from him descended all the fast trotters that have constituted the Bashaws a family. The trotting came from Messenger, and the name, together with great style, excellent constitutions and lasting qualities surpassed by none, came from the Arabian.

Young Bashaw was the sire of Andrew Jackson, the first stallion that ever trotted in public, and the ancester of a large number of celebrated horses, including George M. Patchen; of Saladin, who was also the sire of many fast ones; and of his full sister, Charlotte Temple, that was sent to France. He was also the sire of a black stallion, named George Washington, that was sold to England, for $7,000, about thirty-five years ago, when that was considered an immense price for a horse. The most distinguished son of Young Bashaw was Black Bashaw, out of a mare of the Messenger descent, foaled in 1838 and died 1855. He was never trained, but at the stud he was distinguished for the great number of his fast get out of common mares. He was owned in Bucks county, Pa., and in Philadelphia, all his life, and it is generally conceded by horsemen that Hiram Woodruff expressed a truth when he wrote, in "The Trotting Horse of America," as follows: "George Woodruff is of opinion that Black Bashaw, who was the sire of Awful, Lantern, &c., would have got as many fast trotters as any horse that ever lived, if he had had good mares. He stood at ten dollars and hardly ever received a good mare. Afterwards his fee was raised to twenty dollars, but he still had common mares. The Monmouth Eclipse mare, that was the dam of Lightning, was an exception." Besides those just mentioned, he was the sire of Belle of Balimore, Lady Byron, Spider Legs, Brustar Mare, Whiskey, George Washington, Comet, Martha Washington, Lady Douglass, Startled Fawn, West Philadelphia, Freehold Bashaw, Bay Bashaw, Steel's Black Mare, M'Gregor's Bashaw—all distinguished trotters—and a host of fast and lasting road horses that were never trained for public performances. The mares of his get are in great demand among breeders, as experience has shown that almost any of them, bred to a good stallion, will produce a fast colt.

Though the Bashaws are distinctly of Pennsylvania origin, they have nearly all been bought out of the State by horsemen, in parts of the country where the value of good stock for breeding purposes was earlier appreciated than it was here.

Lightning, mentioned by Woodruff as out of an exceptionably good mare, was foaled in 1855, and is now owned in Chester, Pa., where he has stood for mares since the spring of 1870, His dam was a Thorougbred by Monmouth Eclipse, the sire of many fast trotters, which gives him two strains of Messenger blood on his dam's side, in addition to the two others which he takes from his sire. The history of his life will explain why so much good breeding has shown no results in his progeny. At two years of age he was put into a box stall, where he was kept almost continually for twelve years, without exercise, without any grain, and unused as a stud horse. The perfect symmetry of his form, the style of his carriage, the grace of every movement, and the gentleness and intelligence which are his, correspond perfectly with his high breeding. His size and strength and speed have been diminished by long confinement, but he performs every day of the year nearly all of a physician's driving, in addition to his duties in the breeding stud during the season; and his trotting action, which is square and pure, is rapidly improving. It is not improbable that he will yet rival his illustrious sire as the begetter of fast trotters and fine roadsters.

The Clays are a branch of the Bashaw family. The first of the name was Henry Clay, a son of Andrew Jackson, out of a fast Canadian mare, called Little Surry. There has lately been much discussion of their merits and defects. It is admitted that they trot fast and square, but it is alleged that the Cannuck blood of Little Surry diminished the lasting quality of that branch of the Bashaws. The truth probably is, that this was true of some of the immediate descendants of the Canadian mare, but that subsequent breeding into other trotting families has nearly obliterated any weakness that may have been in the stock. Geo. M. Patchen was a Clay, and nobody questions his lasting qualities; but on his dam's side he inherited the Thoroughbred blood of Messenger, Diomed and Imported Trustee. This accounts for both his speed and bottom, admitting that his Clay sire contributed to the trotting speed. Patchen's descendants have not met the expectations of breeders, for though a large number of his get trot fast, they are coarse in form, and subject to curbs and ringbones. Whether these defects were inherited from Surry has never been shown.

The American Stars are a New York family of much celebrity. The founder of the family was foaled 1837, and died 1861. He had some Messenger blood, but more of Diomed, through Duroc in one line and Sir Henry in another, and the latter was himself closely inbred in Diomed blood, his sire and dam being both by Diomed. American Star was a chestnut, and almost, if not quite rat-tailed, a quality inherited by many of his descendants in the form of very thin tails. Some of the Stars have trotted very well, and Peerless and Widow Machree may be classed among the best. Conklin's American Star, owned in Philadelphia, trotted close to 2.30, and has left some good stock there and in New Jersey, where he has generally stood for several years past.

The Stars are full of game, and very lasting in a race, but too light in the leg bones to make their joints perfectly good. They often spring in the knees if worked hard, but Conklin's American Star and his get are not chargeable with this defect. The Stars are most distinguished by the produce of the mares when bred to Hambletonian. Dexter, Startle, Socrates and Aberdeen, with many others, are of this breeding. There is no breeding for trotters which seems to be better established than the success of this cross, and it may be well to consider in this connection upon what principles this success depends.

The Stars are too light in the bones of the legs to have strong joints, and Hambletonian corrects that defect, which is an improvement on the Stars. That they both have speed and bottom does not account for the fact that nearly all of this cross are better than Hambletonians out of mares of other families that appear to be equally good with the Star mares. It is well known to breeders that certain individual animals "hit" or "nick" with each other in breeding, so that their offspring have all the good qualities of both parents in great degree. It is also known that certain strains of blood hit well when bred together, and whoever will trace the pedigrees of our most distinguished trotters will see that Diomed, an imported Thoroughbred, furnished the best cross with Messenger for the production of trotters that had both speed and bottom. Hambletonian is rich in Messenger blood, and the Stars are rich in Diomed blood—Seely's American Star having one-fourth Diomed and one-eighth Messenger blood, and Hambletonian having five-sixteenths, or more than one-third Messenger blood. This is about the largest amount of the two strains that could be brought together at this day, unless we should resort for Diomed blood to certain Thoroughbreds who, not having any cross of Messenger, have not so much trotting quality. The celebrated running horse, Planet, is reputed to be a natural trotter of no mean pretentions, and he has three-sixteenths of Diomed blood, with not a drop of Messenger. Indeed, there is much reason for believing that the Diomeds not only crossed well with the Messengers, but that they are themselves trotters from which might be selected and developed a first-class family. A son of Planet, named King Alfred, and owned in Wilmington, Del., by Mr. Geo. G. Lobdell, is a Thoroughbred with nearly one-fifth of Diomed blood. He is in all respects a splendid animal, with size and substance enough to beget road-horses. Though not owned in this State, he is near enough to be rendered available, and a cross of the Diomed from so rich a source might be profitably resorted to by those who have mares pretty well in the Messenger blood. There is great reason for believing that results could be thus obtained similar to those produced by crossing the Hambletonians and Stars.

Other families of trotters are the Black Hawks, Morrills and Gold Dusts. The first named originated in Vermont, and the founder of the family is generally called Vermont Black Hawk, and Hill's Black Hawk, to distinguish him from Long Island Black Hawk, a horse of the Bashaw family. He was foaled 1833, died 1856, and belonged, on his sire's side, to the stock known as Morgans, but they are not remarkable as trotters, and he probably took his trotting from his dam, whose pedigree is unknown. The Black Hawks were very fashionable not many years ago, and sold for higher prices than any others of their day. Some of them were among the fastest, including Ethan Allen, Black Ralph, Lancet, Belle of Saratoga, Black Hawk Maid, Flying Cloud, and many others of good repute for speed. The reputation of this family has been well sustained by Ethan Allen, one of the sons of Black Hawk, who, like his sire, is out of a mare of unknown pedigree, but of trotting blood, as is shown by the fact that she produced several other good trotters by other sires.

Ethan Allen is himself a very fast horse, and is the sire of Hotspur, Fanny Allen, Young Pocahontas, Fanny Fisher, Honest Allen, Tom Allen, Billy Barr, Hickory Jack, Fanny Lee, Le Blonde, and others of less note.

The engraving of Tom Allen gives a good representation of the Ethan Allen stock. He is a blood bay, with black points, and has trotted fast for a stud horse, untrained. His dam had both Messenger and Diomed blood, coming through the noted running horse, Cock of the Rock.

Tom Allen is owned by Gen. Hartranft, of Norristown, Montgomery county, Pa.

The Morrill family originated in Vermont, with a horse of that name foaled 1840, died 1862. He was of the Morgan family, but took his trotting from a Messenger cross. His colts were valuable, and many of them trotters. The family is best represented by his son, Young Morrill, foaled 1848, and owned near Boston, Mass. He is the sire of Fearnought, Draco, and others of less repute. One of his get, Col. Jones, a very good horse, out of a Gen. Taylor mare, is owned by Mr. C. Leiper, Chester, Pa. Some of his colts are quite promising.

The Gold Dusts are a family originated in Kentucky, by L. L. Dorsey. They are a branch of the Messengers; handsome, and some of them first-class trotters. They are not much owned in this State.

There are other—sub-families of trotters—branches of those mentioned, but not requiring particular notice.

In all trotting families Messenger blood is strongly infused into nearly all of the most distinguished individuals, and in most of them the trotting quality is chiefly due to him.

There is probably no State in the Union in which the breeding of horses has been more thoughtlessly done than in Pennsylvania. Of course, there have always been in the State men of intelligence, who bred with a definite object, and selected with judgment; but the principal breeders in every State, if we estimate by the number of horses bred, are the farmers who raise one or two colts a year, and it is from this source that the principal demand for all kinds of horses is supplied. In choosing a stallion farmers generally select from two or three that come within their personal knowledge, and the difference of one or two miles in the distance determines their choice. In other words, they breed to the nearest horse.

Very few breeders have the slightest knowledge of the value of pedigrees, but there is a kind of popular notion—a traditional faith—that every stallion must have a pedigree printed as a part of his advertisement. In the present state of popular ignorance on the subject, it is not much matter what is printed as pedigree, for the breeder will not go five miles further with his mare, nor pay ten dollars more to have her got with foal by the best horse in the country; but there are a few, and the number is rapidly increasing, who do appreciate the value of a pedigree, and they are beginning to demand that there shall be some accuracy of statement in that respect.

It is no exaggeration to say, that not one pedigree in twenty advertisements is anywhere near correct. There may be some excuse for this in the ignorance of the owners of the horses, but if they do not know any thing of their horses' pedigree, they should not state, as most of them do, a silly tissue of falsehoods, as absurdly impossible as it is mendaciously impudent. Nothing is more common than for men to state that their horses, or their horses' dams, are out of Messenger mares. In a recent trot of four-year-olds, at Beacon Park, Mass., there were six entries, and two of them were out of Messenger mares. Now, whatever may be true of the stallions and their dams, it is quite impossible that a four-year-old of this year can be out of a daughter of Messenger, insomuch as he has been dead sixty-three years! Nothing is more common all over the country, than Messenger mares, yet there has not been one alive for the past thirty years, and probably not ten of them were alive forty years ago. Some of these mares are *full blooded* Messengers! Of course his own get were only half Messenger, and no amount of breeding-in could produce a horse that would be all of Messenger blood. It is about time for this nonsense to be ended, and in the matter of advertised pedigrees, whoever will sue and recover damages from the lying villians, or put them in the penitentiary for obtaining money on false pretence, will be a public benefactor. There is not much encouragement for public spirited, honorable gentlemen to attempt to improve the horse stock of their neighborhoods, by obtaining first class stallions at high prices, if every scoundrel who owns an over-fed, scrub stud-horse, is at liberty to advertise him as got by Mambrino Chief, or Hambletonian, or

Black Bashaw, out of a celebrated, full blooded Messenger mare. Even the well informed may be somewhat deceived by such outrageous lies, and those who do not pretend to know much about pedigrees, being quite unable to detect any fraud, and equally unable to decide on the ground of pedigree, even if there were no fraud in the case, give their patronage and influence to the stallion that insures a colt for the lowest price, or that happens to be owned by a smooth-tongued, palavering knave who secures the breeder's good opinion for his horse by praising the breeder's mare.

Within ten years a considerable number of intelligent gentlemen, in the eastern part of the State, and perhaps in other parts unknown to the writer, have started breeding farms on correct principles, with the object of producing first-class horses. Already excellent results have been accomplished, both in the production of stock that has paid them well, and by increasing the interest and enlarging the knowledge of their neighbors in well-bred and valuable horses.

Mr. Charles L. Sharpless, of Philadelphia, has a fine selection of brood mares on his farm at Chelton Hills, and four stallions—two, Post's Hambletonian and Cheltenham, by Hambletonian, and one, Magnolia, by American Star. Mr. Sharpless is directing his attention especially to the production of fine road-horses, and though he considers trotting speed an essential, and breeds from the best families of trotters, he wisely does not deem that the only quality needed in a good road horse. Some of his mares are about as near perfection on the road before a light carriage as can anywhere be found, and their ability to take two men in a wagon at a three minute gait on the road is not considered any objection to them, even by Mr. Sharpless, whose Quaker education inclines him away from everything like racing.

Mr. Robert Steel, of Philadelphia, has a breeding farm near the city, at Cedar Park, where, as has been before stated, Happy Medium is at the head of the stud. Mr. Steel has among his mares: Fanny Allen, by Ethan Allen, and Lady Byron, Belle of Bristol, and Brustar Mare, by Black Bashaw. Some of the young things out of these Bashaw mares, by his stallion, Rocky Hill, show most astonishing trotting action and speed when chased up and down a narrow lane. Mr. Steel thinks the daughters of Black Bashaw are the best mares in the world to breed fast trotters from.

Mr. A. Welch, of Chestnut Hill, has a large number of mares, chiefly trotters, the most distinguished of which is Flora Temple. Since the acquisition of the renowned Leamington, Mr. Welch has added several Thoroughbred mares to his stud, and is breeding for runners.

Mr. Daniel Killion, of Philadelphia, has a very large stock farm on the meadows of the Delaware river, a few miles below the city, and breeds about fifty colts every year. He is crossing the descendants of Geo. M. Patchen with a son of Hambletonian, called Hampton. Mr. Killion does not confine his operations to this particular cross, but has selected mares from several other excellent families, and manifests much sound judgment in his choice. This lot of young horses and colts is very promising.

In Chester county, at West Grove, Mr. Charles Dingee has begun stock breeding on sound scientific principles, and is working out good results. His mares are the get of Black Bashaw, Ethan Allen, Geo. M. Patchen, Champion (half-brother of Auburn Horse) and several others of good trotting families, together with a number of thoroughbred mares selected from the stud of Mr. R. A. Alexander, of Kentucky, which he is breeding to his trotting stallion, Brount, by Robert Bonner, one of the best sons of Hambletonian. With rare liberality and judgment Mr. Dingee does not confine his breeding to his own horse, but avails himself of the services of other good stallions to such of his mares as seem best adapted. He is doing a good work in Chester county by instructing breeders in the value of good stock to breed from, and by the fearless manner in which he exposes the base fabrications that everywhere are published as pedigrees.

Mr. C. P. Relf, near Norristown, in Montgomery county, has a successful stock farm with Mambrino Pilot, by Mambrino Chief, at the head of the stud. Mr. Relf is breeding both trotting and thoroughbred mares to his trotting stallion, and has produced a very promising lot of young horses. His stallion has trotted in 2.27½, and is the sire of some fast colts, so that his chance for begetting a second Lady Thorn out of one of the Thoroughbred mares of Messenger descent is not by any means hopeless.

These breeding farms are alluded to for the purpose of intimating what is going on in the State in regard to the improvement of our stock of horses. All of the stock farms mentioned are quite near to Philadelphia, and come within the personal knowledge of the writer, but it is well known that the interest felt and the intelligence manifested on the subject are not confined to one locality. All over the State is shown an increased attention to the importance of raising good stock of all kinds. Farmers, who are the principal breeders everywhere, are all aware that it costs no more to raise good stock than bad after the first investment, and where land is somewhat costly it is a losing business to raise any but good stock, while the very best is always profitable even on lands of the highest price. Another, and the principal, motive for giving some account of what is being done on the few breeding farms mentioned, is the desire to call attention to the fact that those who devote special attention to the subject, and who have very heavy investments at stake in the results, attach immense importance to pedigrees. With them very little is done by guess. Recognizing the fact, as they do, that all breeding for particular results is more or less uncertain in the present state of our knowledge, they adhere all the more strictly to those principles that are well established.

Some reasons have already been given for the opinion that the most profitable kind of horses to breed for at present, and for a long future, are good road horses. In breeding for this class two other classes will be produced, one represented by the very fast trotter, which may be of fabulous value in the market, the other a class of animals too slow for first-class roadsters, but valuable for slower draft. Another class of larger, stronger horses are required for heavier draft, and these will be bred at a profit on cheap lands only, for their market price is always small compared with the cost of producing such large animals. The reasons for this are that it requires no skill to produce a big, rough horse, but does require a great amount of food. The following facts and arguments upon the subject of breeding and rearing horses are not presented for their novelty, most of them being very well known already to many breeders, but are respectfully offered for the instruction and guidance of those who may not have given the subject much attention before.

In all breeding it is commonly accepted as a fundamental doctrine that "Like begets like." This is supposed to mean that the offspring is like the parents, but the expression is so very clumsy that if its meaning were not already in the mind the aphorism would fail to convey any definite idea. Nor is it strictly true that parents beget offspring like themselves, for there are so many influences which modify the results that no breeder is ever astonished if the offspring is quite different, in many respects, from both parents. Many theories have been advanced concerning the respective influences exerted by the two parents upon the character of the progeny.

Nothing is more certain than that every offspring derives its qualities from both parents, and this is true not only in a general sense, but is true of all the particulars. That is, every part of every offspring partakes of the nature of both sire and dam. Every hair, every fibre of the body and every drop of the blood is composed of elements derived from both. In the human family the mixing of widely different races illustrates this principle. No mulatto's hair is exactly like a Negro's, nor exactly like a Caucasian's. The mulatto's skin is never black and never white. His features are neither Caucasian nor Negro, but a mixture of the two. His mental characteristics—intellectual, moral and emotional—are a compound of the two races. There is nothing of him that is purely Negro, but everything is modified by the white parent; nor is any part of him purely Caucasian, but all is modified by the black parent. This principle is of universal application, but it does not imply that every part of every offspring is composed of exactly equal parts of the respective qualities of the two parents. The truth is quite different from such a supposition, as is exemplified in every family of children. A tall, dark-haired man with a short, light-haired wife may have one child with light hair like the mother, and the tall stature of the father; another short like the mother and dark like the father; another like the father in both complexion and stature, and another like the mother in both of these respects. One mulatto may be nearly white and his full brother nearly black; but in all cases no child will be *exactly* like either parent in any respect, but all will partake of the nature of both parents, to some extent, in all respects, and we are never able to foresee to what extent these modifications will occur. Why the same parents should produce one child resembling the father in complexion, and another resembling the mother in that respect, no person has ever satisfactorily explained.

The second principle of hereditary descent is, that progeny inherit the acquired qualities of their parents. Certain breeds of dogs are taught to stop when they scent the game, and wait for a man to shoot it. This, of course, is an acquired quality, for naturally the dog would himself try to catch his game. After a few generations of dogs have had this instruction the puppies will inherit the acquired quality in such strong degree that they need no teaching. Not only will they stand staunch at the first game birds they ever smell, but they also seem to understand everything that is required by a sportsman from a well trained dog. They back another dog that is standing; they retrieve dead and wounded birds, bringing them promptly to their master's feet without once munching them; they obey the same words and signs that their ancestors were taught to obey, and illustrate in striking manner the truth of the hereditary law under consideration. A gentle colt—one not alarmed by the novelty of the situation—will obey, the first time it is harnessed, the same language its parents obeyed. It will be guided by the slightest hint of the bit, will start from a walk into a trot by a slight cluck, will even stop, sometimes, at the word "whoa," and in many respects shows that what was acquired by the parents becomes instinctive in the offspring, and is manifested with almost the same certainty that those instincts are which, from their being longer established, we call natural. Wild hogs subjected to domestication lose their long snouts, their thick coating of bristles, their fierce courage, their restless activity, their erect ears, their sharp senses of smell and sight. These qualities, not being needed in a pen where food is liberally supplied, warm shelter afforded and enemies kept away, become diminished more and more with each successive generation; and each generation inherits the acquired change of the preceding one until the short-snout, lop-ear, sparsely-bristled skin, lazy, gluttonous disposition are all produced. This law of hereditary descent is a very important one to breeders of horses. Many a stallion is kept as if the intention was not to propagate spirit, strength, activity, endurance and docility, but rather those opposite qualities which are justly considered most excellent in Chester White pigs.

How long must any quality have been developed in a parent before it may be transmitted to an offspring? This is an interesting question, and one of much practical consequence. The belief that transient mental impressions may be thus transmitted is as old as the Book of Genesis, where we read that Jacob bargained with his father-in-law, Laban, for all the cattle, sheep and goats that should thereafter come speckled, spotted, or ring-streaked; and that he took green rods and peeled them in rings and streaks, and set them in the watering troughs that the impression made upon the minds of the cattle might be transmitted in the color of the offspring.—We also read there that Jacob managed to have the stronger of the young stock become his own, and the feebler, Laban's, by allowing only the stronger of the parents to drink at the troughs were the rods were. He thus applied the law of hereditary descent with reference to two objects, and with what success is shown by the following comment: "And the man increased exceedingly, and had much cattle."

There is abundance of testimony to prove that very transient conditions of a parent may become permanent in the constitution of the progeny.—Children of the same parents will all have resemblance to each other, and yet no two will be alike. The reason is obvious: The individuality of the parents is preserved through all the vicissitudes of life, and all the children inherit from that individuality a general resemblance; but neither parent is always just the same in condition of mind and body, but changes from year to year, and the children, born a year or two apart, inherit the changed conditions of both parents. In further proof of this theory it may be stated, that twins may be conceived at one sexual intercourse, and may therefore be almost exactly alike, as they often are, for in such case there is no reason why they should be different. Or they may be begotten at two connections, which may be one or two days apart, and in that case the change which has taken place in both parents in that short time will be manifested in the offspring. It has happened that a white woman in Charleston, S. C., bore twins, one of which was white and the other a mulatto. She confessed her intercourse with both a white and a black man. This case does not illustrate the principle under consideration, but it shows, what might be doubted by some, that twins are not always the result of a single sexual intercourse; and therefore, that the dissimilarity of appearance occasionally seen in twins does not disprove the theory advanced.—Even mental impressions of but momentary duration, if they occur just at the moment of conception, may be transmitted. The color of domestic stock is often affected by such cause, without doubt. The popular belief (which is entirely fallacious) that impressions made on the mind of the mother *during pregnancy* will affect the offspring, had its origin in this principle. The impression must be made on the mind of either parent *be-*

fore conception, and must be a part of the parent, to be transmitted. No mental impression can affect the child in the womb. Its organization is then established, and there is no nervous connection between it and the mother by which impressions could be conveyed.

What may be stated as the fourth principle of breeding, is the fact that when the two parents are too nearly alike, the progeny will be deficient in constitution, and when the parents are widely different, the progeny will be superior in health and longevity to the parents. This principle is well illustrated on the one hand by the intermarying of cousins, which is followed, in fearful frequency, by both mental and physical defects in the children; and on the other hand, by the breeding together of the horse and the ass, which produces a mule, whose life is about as long as the lives of both parents together, and whose strength and health are vastly superior to either parent. If relations of very evenly balanced and sound mental and physical constitutions intermarry, their children may not show so much excess or deficiency of any mental or physical quality as will amount to deformity of body or eccentricity of character, but if there should happen to be any family peculiarity, it will be re-produced in excessive degree in the children. This was very well shown in some experiments made by the writer, in attempting to re-produce ducks of a particular color. He happened to see in the yard of a neighbor, a Muscovy drake of a beautiful drab or dove color. It had been about twenty years since that color had shown before in that family of ducks, and during that period the flock had been very frequently crossed with drakes from other flocks that were no relation to these. The re-appearance of the color after so long a time, was a curious and interesting case of breeding back. The drake was purchased and bred one year to three ducks without success. None of his get were drab. He was lent to a neighbor, who bred him one year with no better luck. Again, he was lent to a friend in a neighboring county, who bred him one year with like result.

Having a strong prejudice against the breeding together of blood relations, and aiming to improve the breed of all domestic stock by careful selection of new males each year, it was with no small repugnance that the trial was made of breeding together, in one case, the drake and his own offspring, and in another case, his offspring with each other. The result was surprising, for, in both cases, about one-half of the ducklings were of the desired color. It is plain to be seen how a whole flock of ducks might thus have been produced of that color by selection and in-breeding, but it would have been at the expense of size and vigor. It is, probably, equally true that parents, *not related by blood*, but having both any similar peculiarity of constitution or character, manifest the same law, and produce offspring having the peculiarity in greater degree. A considerable number of facts might be adduced, which have been observed by the writer, that seem to prove quite conclusively the danger to offspring of intermarriage between men and women who are too nearly alike in particular points of constitution, though not related by blood. This law has many painful illustrations resulting from both parents having tendency to the same hereditary diseases. A particular case, of a very curious kind, deserves especial mention. Two young and healthy parents, not related in any traceable degree, both have strikingly large and handsome black eyes, that are as much alike in appearance as they could have been if the man and his wife had been twins. In both, the eyes are perfectly sound, and there is no hereditary tendency to blindness in either family; but their two children, though otherwise remarkably well developed in mind and body, both became blind in infancy, with amaurosis. There seems to be no other explanation of the defective eyes in this case than the too great similarity of the parents in that part of their organization. The judicious application of this law of hereditary descent is of great importance in breeding for any particular quality, as we will see presently.

There has been, for many years, a current belief that if a female has been impregnated by one male, all of her future progeny by other males will somewhat resemble the first she bred to. Hence it is generally believed that if any purely bred female, as a Devon cow, is bred to a male of another breed, as to a Durham bull, she will never after produce pure Devons though bred to a Devon bull. This notion is based upon the report of a single case, which is at variance with thousands of other cases. The single case alluded to is of a mare that was bred, in England, to a wild ass of the species called Quagga, and produced a mule colt. Her three following colts, by a horse, all showed marked resemblance to the mule. The case is authentic, and the stuffed skins are still preserved. In this country it is common, in Kentucky and Missouri particularly, to breed mares first to an ass, because the foal is smaller, and this is considered an advantage; but such a thing as any subsequent colt by a horse looking like a mule was never witnessed. Alice Carneal, the dam of the renowned Lexington, was bred to an ass, and produced a mule, before she was bred to Boston, the sire of Lexington. The case of the English mare and her mulish colts admits of another explanation. The appearance of the wild beast probably left a strong impression upon her mind, which was associated with sexual intercourse, and each following intercourse, though with a horse, revived the remembrance of the Quagga, and the mental impression was transmitted to her offspring, as mental impressions often are. Any one may examine the children of a woman by her second husband in vain, if he look there for resemblance to her first husband. Two cases have come under the writer's notice of white women who bore each a mulatto child, and afterward had children by white men, and in both cases there was no resemblance to the Negro parents in the white men's children. Nearly every breeder can call to mind cases of mares that have produced colts from different horses, but no one can thus remember that any of the colts resembled any of the sires except its own.

There must be some law that determines the sex of the offspring, and many theories have been advanced on the subject. In the summer of 1846 the writer confined a terrier slut in a corn-crib for three weeks, and released her only when the erotic heat appeared to have subsided. She was afterwards covered by a neighbor's dog, once, and the produce was seven dog pups. At her next heat she went from home and was followed by several dogs from the beginning of the heat. The produce was eight slut pups and one dog. At her third breeding she had a single intercourse with Dr. A. L. Elwyn's imported terrier, fifteen days from the commencement of her sexual excitement, and the result was five dog and two slut pups. In the first and last cases the absence of all males for a long period after her heat began, implied a scarcity of males, and the effort of nature was to restore the just equilibrium of the sexes by producing males to supply the implied deficiency.

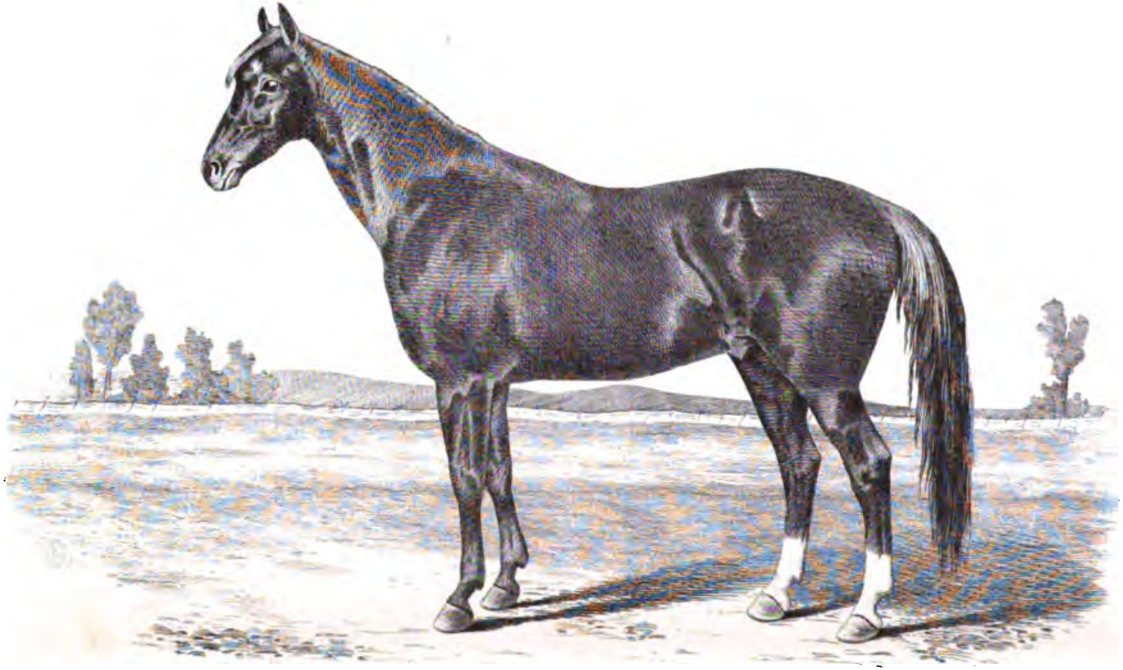
In the second case the conditions implied an excess of males, and hence the production of females. In the following year a cock of the Jersey Blue breed, then in fashion, was bred to nearly thirty hens after they had run several weeks in the spring, with a cock rendered impotent by age. In this case the conditions strongly implied a scarcity of males, and the result was nine cockerels to each pullet—counted as soon as they were old enough to distinguish the sex. Removal to a city prevented further experiments in this interesting matter, but the theory was so plausible and there was so much correspondence in all of the facts that it was taught in lectures on Physiology, delivered to many thousands of persons in several of the States. From these teachings have followed innumerable observations and experiments, many of which have been narrated to the writer, and all of them confirm his teachings on the subject. Applying the law to breeding horses, it follows that to get a mare colt the mare should be bred in the beginning of her erotic heat, and to get a horse colt she should be served at near the end of the heat.

In breeding large and small parents together it has been observed that the offspring generally takes size from the dam. This is shown in breeding mules, which are out of mares, by a male ass. The mule is always above the size that would be an average between the two parents, and is often larger than its dam, though the ass, its sire, is very much smaller. The hinney is the offspring of a female ass by a stallion, and is always small like its dam. There are other facts disclosed by the breeding of these two different species of animals together which are of great interest. The mule, though it takes size from the mare, its dam, takes quality chiefly from its sire, the ass. It has his braying voice, his big head and long ears, his scanty mane and tail, his narrow feet and his stubbornness. The same principle is illustrated again in the hinney, which, though small like its dam, the female ass, has a small head, short ears, full mane and tail, round feet and a voice which is not a bray but a whinny, from which it takes its name, the Latin word *hinnio* meaning to whinny like a horse. The mule looks like an enlarged ass; the hinney looks like a diminished horse. It is a general belief among breeders that the male imparts more of quality than the female, and the facts above stated seem to justify the belief. In breeding horses it is held as sound doctrine that in crossing the Thoroughbreds with common, coarser horses, the stallion should be the Thoroughbred. The colt will then probably have the size of its coarser and larger dam, with the style and finish of the finer bred sire. If the reverse experiment be tried, the result is likely to be a small, coarse animal. While this is true in general, as applied to horses, and always true as applied to crossing the horse and ass, it must be taken with some allowance. If the mare is very coarse her colt will not be very fine from any horse, though it will be finer than if the rule were reversed in its application; and if the horse is very small his colts will not be very large from any mare. And so of quality; the horse must have good mares to enable him to beget good colts. This is no reason for putting inferior mares to worthless stallions, for though such a mare may not produce a first-rate colt by any horse, the better the sire the better the colt.

It is generally believed that certain diseases are hereditary, but it is more accurate to say that the tendency to them is hereditary. On being overworked one horse may become blind, another curbed, and another sprung in the knees, because of inherited weakness at those points. The principal diseases that should be avoided in breeding are: Contracted heels and all other chronic foot lameness, blindness, spavin, sprung knees and knuckled fetlock joints, curb, ringbone and cribbing. The defective formation and way of going that cause interfering and grabbing are also hereditary. In all cases reasonable allowance should be made for the over-work and abuse that may have induced the disease, and particularly for the effect of working colts before they are matured—a fruitful source of leg blemishes.

Having now presented the laws of hereditary descent, we are prepared to consider their application in the breeding of horses, and it may not be amiss to state that the same laws govern all animals, with only such variation as may be caused by difference of conditions; so that any experience derived from observations made upon one species of animals may be profitably used in the breeding of any other species.

The slightest examination of the pedigrees of distinguished trotters shows



HAMBLETONIAN STALLION

"HAPPY MEDIUM."

Owned by Robert Steel, Esq. Philadelphia.

[illegible] Lith. [illegible]

their relationship to each other in so many cases that no one can doubt the derivation of their trotting speed from a common ancestry. The old notion, which was almost universal, ten years ago, that trotters are all chance horses, has been very thoroughly disproved.

The rapid increase of fast trotters within five years, and the increased average of racing speed, is the result of scientific breeding. A breeder does not hesitate, now, to pay from $100 to $500 for the services of a stallion to a good trotting mare, for the produce at five years old may sell for any sum between $5,000 and $50,000, according to speed and stamina.

In choosing a mare to breed from, for any particular quality in the offspring, the breeder will, of course, select a mare possessing the desired quality herself, if he has any liberty of choice; but it commonly happens that the breeder is compelled to breed from the mares he happens to have, whether they exactly suit him or not, and it then becomes necessary to use much prudence in the choice of a stallion. If the mare has any defect or deficieny, of course the horse should not only be free from the same defects, but, if possible, he should have so much excellence at the point defective in the mare as to correct it in the offspring. Thus, a mare may be too short in the neck, or too long in the back, or too big in the head, or too long in her legs, and may, notwithstanding her defects, be an excellent animal in more important respects, and worthy of being bred to a first rate horse. If she is a trotter and has a short neck, let her be bred to a trotting horse of better style in that respect. If she is a draft mare and too leggy, let her be bred to a shorter legged draft stallion. If she is blind, breed her to a horse that not only has good eyes, but that is also free from all inherited tendency to blindness; and so apply the rule in all respects.

In choosing either mare or horse to breed from for trotting speed, the first thing to be considered is pedigree. Many breeders, and particularly those who know least about it, may differ from that opinion, but it is not expressed without very much consideration of a great many facts. By pedigree is not meant merely a long list of names, for one horse has about as many ancestors as another, but the showing, by accurate statement, that the sire of the horse in question was a trotter, that his sire's sire and his sire's dam were both trotters, or that they were descended, on one or both sides, from trotting families; and so of the dam's pedigree. The more lines of trotting descent in a pedigree, and the longer they are, the better. It is better, also, that the horse we are about to breed from should be himself fast, but if his pedigree is all right he will beget fast colts whether his own speed has been developed by use or not. Such a horse might not be able to beat three minutes, and his rival stallion, who is without a relation in the world that ever trotted fast, may be trained to trot in less than three minutes. Now, which should we choose? The progeny of each, from mares of similar quality, will inherit the speed of the *families* their sires belonged to. Or it may be that a horse has trotting speed by inheritance from one line of ancestry only; in such a case some of his get may be as fast as himself, but the chances are much greater that his colts will take after some of his many ancestors that were not trotters. It may be, and often so happens, that a good trotter is produced by breeding from two parents, neither of which were fast, but both inherited some of the quality from their ancestors.

When the trotting thus latent on both sides is brought together, it very often shows in sensible form in the offspring. Much more might we expect this result when it was latent on only one side.

This is well shown in breeding Thoroughbred mares to trotting stallions. If the mare has any Messenger blood, as many Thoroughbreds have, she will produce a trotter, though she and all her ancestors for many generations have not been trotters; but if she has no Messenger blood, the result is doubtful. As has been before stated, the Diomed blood may produce the same result, as is shown remarkably in the cases of the trotting stallions, Corbeau and Alexander's Pilot, both Kentucky horses, both begotten by Canadian trotters, and both out of mares rich in the Diomed blood. Corbeau is the sire of Billy Boyce, that paced a second heat in 2:15¼, and the third in 2:14¼, making the last half of the second mile in 1:05¼, a rate of speed that has never been equalled by any other pacer or trotter. Alexander's Pilot, as before stated, is the founder of a numerous family of trotters, and had no Messenger blood that can be discovered. But what is to be shown is the remarkable fact that the trotting quality may be latent for several generations, and show itself strongly when crossed with the same quality from another source. American Eclipse, a celebrated fast-running Thoroughbred, had both the Messenger and Diomed bloods combined in him, and his daughters and grand-daughters, bred to trotting stallions, are famous for producing trotters, though American Eclipse himself never begot a fast trotter. If it had happened that any trotting mares had been bred to him, he undoubtedly would have produced splendid trotting colts. The trotting quality appears to have been latent in American Eclipse, but his son, Monmouth Eclipse, had another strain of Messenger blood on his dam's side, and begot many trotters. It is highly probable that if Monmouth Eclipse had been trained to trotting, instead of running, he would have equalled any of his day. The descendants of these horses trot fast because the quality was in their pedigrees, and not because they were themselves trotters. In breeding for fast horses, all sensible men will display their skill and judgment in choosing the best to breed from; and pedigrees are the guide to all rational choice. Any breeder who thinks he can develop fast trotters out of slow families, must expect to live about seven hundred and forty-two years, and must have some other source of income than his breeding farm.

There is probably no subject that men are so confident in their own opinions about as horses, (except perhaps theology,) the self-confidence being in direct ratio to their ignorance. If a horse be sick, every man who sees him will prescribe some infallible remedy, and no two remedies will appear to be prescribed with any similarity of intention. Or if a horse baulks and refuses to move, every bystander suggests a remedy without hesitation, but not one of them could cure that horse of his habit. Of course there are exceptions to these sweeping assertions, and the exceptions are composed of just such men as do believe in pedigrees—thoughtful men. The men who do not believe in pedigrees, think that their personal examination of horses will afford them all the knowledge that can be obtained. They criticise the horse's countenance, the slope of his shoulder, the crook of his hind leg, he is a little to light in the muscle on the loin, or his back is a little too long, or the self-appointed "judge of horse flesh" don't exactly like his movement—the way he picks up his fore feet. He is told that the horse is sound, gentle, a good traveler, was sired by Robert Bonner, his dam by American Star, grand-dam by Black Bashaw. He don't care for pedigrees, he forms his own opinions, (by external appearances alone.) and he likes that other horse a great deal better. He is a mighty fine, big horse, and has good points all over.

Now, it is all very well that a horse should have good points, and good horsemen appreciate them; but no man could distinguish by external appearance the trotter that sells for tens of thousands of dollars, from the horse that is worth only two hundred dollars. Nothing can be known of a horse's speed by his form, nor even by his way of going in a moderate gait. Some step short, and some have a long stride, some have much knee action, others glide along with a low, level, mode of action; and they go fast in all of these ways of going, and they don't go fast in all of them. And so of form: some have crooked hind legs, what are called sickle hocks, as the Hambletonians, and some, like Flora Temple, are very straight at the hock. She is remarkably light in the thigh, too, and is evidently very deficient in muscle just where it is most needed—according to all common notions on the subject. In a private letter to the writer, Mr. Charles L. Sharpless, of Philadelphia, says: "I have bred perfection in form, form that suited not only myself, but judges that felt sure it represented quality, and yet behind that perfect form you had to work your passage with the whip, conscious all the time that the animal would arrive home exhausted and his driver disgusted." There is only one sign of a fast trotter that has never, in a single instance, been known to fail. It is, to go fast when tried. How uncertain, then, must be all estimates of quality that are based entirely on appearances, and how fallacious is this method of selecting a horse to breed from, instead of being guided by performance and pedigree. Men will very confidently form opinions of colts, and decide that one is a great deal better than another, and this at an age when they can tell nothing of their future, not even what color they will be. An intelligent horseman will estimate the value of a colt by its pedigree alone, for that is the only indication to what it will be when grown. Agricultural societies sometimes offer premiums for the best brood mare and colt. Who can tell how good a brood mare is before her progeny have been tested? And who can tell anything about the colt by its appearance?

When Daniel Jeffry's mare, in Philadelphia, in 1828, dropped a foal by Young Bashaw that walked on its pastern joints, and in all respects presented a most miserable appearance, Mr. Jeffry offered any of the boys working in his brick-yard a dollar if they would kill and bury him out of sight. Mrs. Jeffry, however, warned them that the boy who killed that colt should never eat at her table again. The tender sympathy of a woman saved the life of the renowned trotting stallion, Andrew Jackson, the progenitor of many of our best trotters, and himself a trotter that made Edwin Forrest go in 2:31¼ to win. (See Wallace's American Trotting Register.)

If a lot of colts were on exhibition, accompanied by full pedigrees, there would be some basis to form an opinion on, but only the most intelligent breeders would then be competent to estimate them correctly, and a very great many, indeed, of those who witnessed the award would condemn it.

It is a gratifying fact, that the number of those who are basing their breeding operations on correct principles, is rapidly increasing in the State, and that the prospect of a thorough improvement of the horse stock of the Commonwealth is not very remote, notwithstanding the present general indifference to the only means by which such a desirable result can be accomplished. The present stock of horses in Pennsylvania is a very good basis upon which to establish all that can be desired. The improvement must be made by the intelligent choice of stallions to breed to, and by rational care of the young stock during its period of growth.

In establishing the breed of Thoroughbreds in England, it was not derived entirely from eastern horses, but had a great many infusions of the common horse-blood of the country, as is very well known. At the time when the English were importing Oriental horses from Arabia, Barbary states and Turkey, from which importations were chiefly derived the breed of racing horses, now known as Thoroughbreds, there were, in those eastern countries, thousands of miserable scrubs that were far inferior to many of the native English horses of the same period.

It may be conceded that some of the imported horses were superior to any of the natives for racing purposes, but it must also be admitted, that many of those imported were inferior to some of the natives, in qualities essential to the perfect race-horse. It then follows, that occasional admixtures of English blood might have been of much advantage, and the history of Thoroughbreds shows that some of the best of the earliest racers were part English, and it is probable that they owed their superiority to that fact.

The Oriental horses were too slight in form, and too small, and these were defects that would be corrected by a cross with the stouter and larger English horses. These facts are alluded to, to show that all excellence is not found in any one breed, and that prudent crossing of breeds, and judicious selection of the offspring to breed from again, may be a useful means to the production of any desired result.

The common horse stock of this State contains many thousands of very valuable animals which may be used as the starting point from which all possible improvement may be attained.

Henry William Herbert, a writer on horses, of very varied knowledge, and with large opportunities of observation, both in Europe and America, thus speaks of the horses of this country: "And I must say, in conclusion, that the general horse of America is superior, not in blood or in beauty, but decidedly in hardihood to do and to endure, in powers of travel, in speed, in docility and in good temper, to any other race of general horses in the known world."

There are mares in this city of Chester, working in carts, that could not easily be excelled in size, form, strength, docility and beauty by any Percheron mare that could be found in France. Here is a basis for the building up of a class of draft horses, and it is a pity these mares are not bred to good Percheron stallions and their excellence perpetuated. There are other mares in this county of Delaware that are fine road horses, gamey, speedy and lasting—mares that if bred judiciously would produce colts superior to themselves and of great value to the breeder. A few generations of judicious breeding to stallions of the best trotting families would produce a class of horses, from such mares, that would elevate the stock of the county to more than double its present value, and at a cost very little more than to produce inferior stock. What is true of this locality is equally true of all other parts of the State.

After a good colt has been obtained by rational breeding, it should be well cared for. If the mare can be spared from work while she suckles her colt, or if she is used to do farm work, which can be done while suckling, it is better to have the colt come pretty early in the summer, but if she is needed for such work as will not allow of the colt's following her, it will be more convenient to have a fall colt that can be kept in the stable while the dam is at work. A mare will milk better on grass, and a colt will thrive better in a field than in a stable. Sunlight and exercise are essential to growth and health, a fact not much heeded by thousands of invalids who die prematurely for want of more light. Darkened rooms are a common cause of consumption, and many a woman saves the color in her carpet at the expense of the color in her cheek. Many a life is sacrificed in preserving furniture and walls from fly-dirt, all of which is well enough if the carpets, &c., are worth more than the life, which may be the case with simpletons, but is not true of well-bred colts. They are worth saving in good health, and if foaled late in the summer, or in the fall, should have a run every day out of the stable during the winter. This is needed by all colts that are stabled, whether they are weaned or not. A colt that is weaned in the fall, which is commonly the case, should not be allowed to get poor in its first winter. True, it will pick up again on grass and improve so rapidly in the spring that its wretched condition during the winter will seem to have really been an advantage to it.

This is a grave mistake. There is a crude notion extant that hardships make young stock hardy, and it is not uncommon to see it looking pretty "hard" in the barn-yard; poor, dejected, rough-coated, pot-bellied, knuckled in the hind fetlocks, sprung in the knees, ewe-necked, standing in filthy mud at an empty crib, cold and hungry and perhaps thirsty, stunted in growth, dejected in spirits, and in all respects just about as miserable as it can be, and keep alive until grass grows. One of the advantages incidental to breeding good stock is that it gets better care. If the service of the horse costs $50, or more, the colt will be looked after. The poor neglected weanlings described will fatten and grow during the summer, to be subjected again to another winter of hardships, but it does better with the same treatment the second winter, unless not sufficiently fed, which is a treatment nothing can stand. If the same conditions were imposed during the whole period of growth, the effect would be very perceptible, but although the summer in some degree removes the effect of the winter, no animal so treated ever becomes what it might have been in size, usefulness and in symmetery of form. This may be illustrated by calling attention to a class of cases that may be witnessed every where in this country. It has long been the pet policy of England to oppress those of her subjects who have a different religious faith and who live on another island, and the effect of that oppression is shown in diminished stature, an awkward, heavy walk, a hasty temper, a suspicious disposition, and a quickness of self-defence by deception, which is the only defence left to the oppressed. The nationality of these people is expressed in their attitudes, in their movements, in the expression of their faces, and in all these respects they are just as their parents were, and just as their children are who are born and educated, and fed and clothed under the same circumstances, in the same country; but their children born and raised here, can not, commonly, be distinguished from the children of Americans. The transformation in a single generation is truly wonderful. Better food and clothing, education, and more than all the inspiring effect of equal political, civil and social rights with their fellow men, lift them at once up from the degradation of mind and body, that is the consequence of

> "The rarity of christian charity under the sun."

When a breeder of horses subjects his colts to degrading influences he is pursuing the English policy. If he would have beauty, good size, graceful movements, gentle and affectionate dispositions, fine development of muscle and nerve, with corresponding strength and speed, he must adopt the American policy; he must pass a fourteenth amendment and then a fifteenth amendment on his former practices if they need it, and as his fillies are quite as important as his horse colts, he must anticipate his government and pass a sixteenth amendment. Every colt should be kept in thriving condition all the year round, and in winter no grain is so good for them as oats, which supplies material for the growth of all the tissues, and is not so dangerously stimulating as maize and barley and rye, and the preparations from wheat. If it will not pay to feed liberally, get some stock that will pay. No farmer can afford to raise poor stock unless he has made his money at something else, and such farmers seldom have any but good stock. City farmers may not always make farming profitable, but that is not because they keep good stock, but on the contrary the raising of it often saves them from the loss which generally attends those who attempt farming, that were not raised on a farm.

A strong objection exists in the minds of many of our best agriculturists against trials of speed at agricultural exhibitions, and there is much reason for the objection as these trials are sometimes conducted. The object of such exhibitions is the advancement of the interests of agriculturists, and not to afford amusement by making them mere racing events, in which the contesting horses are trained for public racing and are owned in distant places. Stallions kept for breeding purposes, and horses raised in the neighborhood, that represent different families of trotters, are those in whose speed farmers and other breeders are chiefly interested. There can be no more harm in a trial of speed than in a trial of strength, and no more immorality in breeding for a fast road horse, than in wasting grain to make a large ox outweigh a neighbor's. It is only by such trials of speed that we can know which is the best horse to breed from of any number having about equally good pedigrees. We want to see the stallions go, and we want to see their progeny tried before we can have the data upon which to base a sound opinion. For such trials, which must be in themselves harmless as well as useful, there is no better place than at the agricultural exhibitions, where the people are who are interested in the matter. Those persons who wish to enjoy trotting or running matches, made with reference only to amusement, have plenty of other opportunities to witness them, and should not insist upon obtruding them upon people who assemble for other purposes.

There is great difference in the objects of the two kinds of trials of speed, and while one is in perfect harmony with the intention of an exhibition, and can not fail to increase the general interests of agriculture, the other is likely to attract attention away from other objects of interest in the exhibition, and thereby lessen the usefulness of the occasion to all who are interested in improved agriculture. It is greatly to be hoped that in future all such trials may be upon the condition that every animal entered for a premium shall have its pedigree stated as fully as known. This, published in the report of the result of the trials, would be of immense value to breeders. It would be a guide in the choice of horses and families of horses to breed from, and would instruct the community in correct principles relating to this important matter.

Whatever interest this brief essay may excite in the public mind in relation to horses, cannot fail to be attended with one result that is always gratifying to the writer, which is this: Whoever becomes imbued with an intelligent interest in these gentle friends and companions of man—these most useful and sometimes much abused servants—will not fail to appreciate their unresisting obedience, their patience and their affection, and will therefore become their protector and friend. He will thus not only serve the interests of humanity, but will ennoble himself, for mercy is twice blessed, "blesseth him that gives and him that takes."

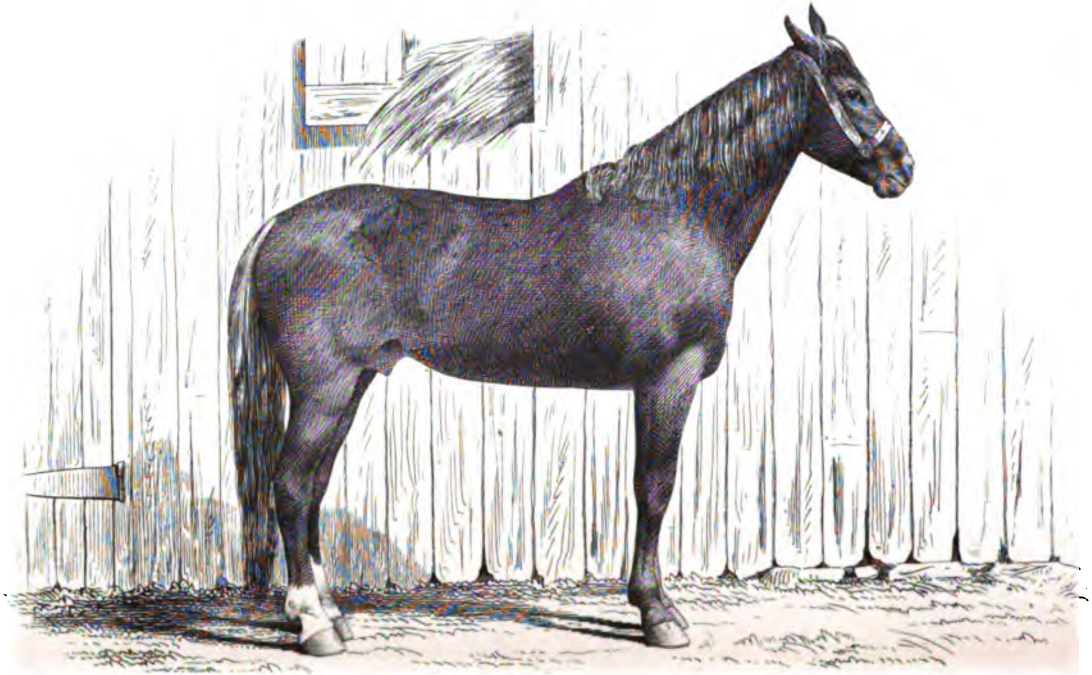
AGRICULTURAL CONVENTION.

HARRISBURG, *September* 17, 1869.

The delegates to the State Agricultural Convention, called by the State Agricultural Society, assembled in the Hall of the House of Representatives at three o'clock yesterday afternoon, and were called to order by Mr. George Rhey, of Westmoreland county, who nominated for temporary officers the following named gentlemen, selected at a preliminary meeting in the morning:

President—Mr. Joshua Wright, of Washington county.

Secretaries—Hon. A. B. Longaker, of Lehigh, and John A. Smull, Esq., of Harrisburg.



MAMBRINO CHIEF STALLION,

"DAUPHIN"

Owned by Joseph Montgomery, Harrisburg. Winner of the Colt Race at Exhibition of 1869.

Benj Singerly Lith Harrisbg

The temporary president ordered a call of delegates, when about sixty responded to their names, representing the following counties, principally on behalf of the agricultural societies thereof:

Allegheny county—W. W. Patrick, James Kelly, Jno. E. Parke.
Bucks—Henry T. Darlington, Jno. S. Williams, Wm. Hillyer.
Berks—Tobias Barto.
Bradford—H. N. Williams, J. F. Chamberlain.
Chester—Isaac W. Van Leer, Samuel J. Sharpless.
Centre—D. G. Bush, Moses Thompson, P. G. Meek.
Clinton—Alex. Reed, D. S. Smith, Geo. W. Parsons.
Cumberland—Fred'k Watts, Samuel Wherry.
Columbia—George Scott.
Dauphin—A. O. Hiester, John P. Rutherford, D. W. Gross.
Indiana—D. M. Marshall, A. W. Kimmell, A. B. M'Clain.
Juniata—Hugh Hamilton.
Huntingdon—Livingston Robb, Graffius Miller, Sam'l S. Brown.
Greene—Jos. Sedgwick.
Lancaster—J. G. Peters, H. M. Engle, Levi W. Gross.
Lebanon—William Rank, G. Dawson Coleman.
Lycoming—Dr. Hugh Montgomery, Theo. Strubigh, H. W. Petriken.
Luzerne—Charles Dorrance.
Mifflin—Samuel Work.
Montgomery—W. H. Holstein, Joshua Ashbridge, Col. T. P. Knox.
Northampton—Joseph Sigman, ——— Cattell, LL. D.
Northumberland—W. H. Kase, Robert Montgomery.
Philadelphia—A. Boyd Cummings, Dr. James A. M'Crea.
Washington—Henry J. Vankirk, A. J. Buffington, John Bowman.
Westmoreland—Amos Trout, Jas. A. Hunter, D. W. Shryock.
Susquehanna—Captain John C. Morris.

Trustees of the Agricultural College were present as follows: A. O. Hiester, James Kelly, A. E. Kapp, H. N. M'Allister, B. Morris Ellis and Gen. Harry White.

Prof. Thos. H. Burrowes, President of the Agricultural College, was, on motion, admitted as a delegate.

The following officers of Pennsylvania State Agricultural Society were present as delegates:

PRESIDENT.

Amos E. Kapp, Northumberland county.

VICE PRESIDENTS.

1. James A. M'Crea, M. D., DeLancy Place, Philadelphia.
3. W. H. Drayton, Philadelphia.

4. A. B. Cummings, Philadelphia.
5. Adrian Cornell, Newtown, Bucks county.
6. W. H. Holstein, Norristown, Montgomery county.
7. Samuel J. Sharpless, Street Road, Chester county.
8. Tobias Barto, Reading, Berks county.
9. Jacob E. Kreybill, Marietta, Lancaster county.
10. Martin Early, Palmyra, Lebanon county.
11. Joseph Sigman, Easton, Northampton county.
12. Daniel G. Driesbach, Beech Haven, Luzerne county.
13. George D. Jackson, Dushore, Sullivan county.
14. John A. Smull, Harrisburg, Dauphin county.
15. George H. Bucher, Hoguestown, Cumberland county.
17. John I. Thompson, Martha Furnace, Centre county.
18. B. Morris Ellis, Hughesville, Lycoming county.
19. Henry Souther, Ridgway, Elk county.
20. James C. Brown, Greenville, Mercer county.
21. George Rhey, Millwood, Westmoreland county.
23. John Murdoch, Jr., Pittsburg, Allegheny county.
24. Joshua Wright, Washington, Washington county.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

J. R. Eby, Harrisburg, Dauphin county.
A. B. Longaker, Allentown, Lehigh county.
John H. Ziegler, Harrisburg, Dauphin county.
Thomas P. Knox, Ex-President, Norristown.
A. Boyd Hamilton, Ex-President, Harrisburg.

CORRESPONDING SECRETARY.

Elbridge M'Conkey, Harrisburg, Dauphin county.

LIBRARIAN.

Lucius Rogers, Smethport, M'Kean county.

RECORDING SECRETARY.

D. W. Seiler, Harrisburg, Dauphin county.

TREASURER.

John B. Rutherford, Harrisburg, Dauphin county.

On motion,

The members of the Committee on Agriculture of the House of Representatives were admitted as delegates, viz: Messrs. Miller, Stranahan, Herrold, Leslie, Kerr, Summy, Longenecker, Robison, (Blair,) Bossard, Breen, Eschbach, Dill, Hursh, Westler, Sedgwick.

On motion,

Members of the Senate Committee on Agriculture were admitted as delegates, viz: Messrs. Stutzman, Billingfelt, Robison, Brown, (Northampton,) Turner.

Col. Thomas P. Knox, of Montgomery, moved that the Governor and the Secretary of the Commonwealth be invited to take seats on the floor of the convention, which was agreed to, and Gov. John W. Geary and Hon. Francis Jordan were accordingly introduced to the convention.

Mr. Miller, of Huntingdon, moved that a committee of five be appointed on permanent organization.

Agreed to, and the president appointed on said committee Messrs. Miller, of Huntingdon; John Murdoch, Jr., of Pittsburg; Martin Early, of Lebanon; A. O. Hiester and John P. Rutherford, of Dauphin.

Mr. George Rhey, of Westmoreland, moved the appointment of a committee of seven to prepare business for the convention.

Agreed to, and the president appointed on said committee Messrs. M'Allister, Cornell, Rhey, Sharpless, Cummings, Patrick (Allegheny) and Stutzman, (Somerset.)

Subsequently Mr. Miller, as chairman of the committee on permanent organization, reported:

President—Gov. John W. Geary.

Vice Presidents—Col. Thomas P. Knox, John E. Parke, Thomas Searight and Moses Thompson.

Secretaries—Hon. A. B. Longaker, John A. Smull.

Governor Geary, on taking the chair, addressed the convention briefly, reciting the fact that he had been a member of the State Agricultural Society for sixteen years, and had all his life felt a deep interest in agricultural affairs, having for many years been a practical farmer himself. He thanked the convention for the honor it had conferred upon him.

Senator Harry White was, on motion of Mr. Chamberlain, of Bradford, invited to address the convention. General White in turn called upon Senator G. Dawson Coleman, of Lebanon, who replied briefly.

Hon. Thomas H. Burrowes, of Lancaster, offered the following resolution, which was laid over for consideration:

Resolved, That this Convention unites with the Philadelphia Academy of Natural Sciences in urging the Legislature to publish the Botanical Survey of the State, made by Prof. T. C. Porter.

Mr. Rhey, from the Committee on Business, reported the following resolutions, viz:

Resolved, That we most earnestly recommend to the State and county agricultural societies, the arrangement of their respective exhibitions so as to allow the county societies to become exhibitors at the State exhibitions.

Resolved, That the incorporation, erection and endowment of the Agricultural College of Pennsylvania, and the appropriation of the one-tenth part of the proceeds of the Agricultural College land-scrip towards the establishment of three experimental farms in connection therewith—one near the College, one in the eastern and one in the western section of the State—was a great move in the right direction toward the promotion of the best interests of the agricultural community.

Resolved, That as this institution is under the government and control of the industrial classes, of whom agriculturists constitute a majority, *they* have no ground to complain of inattention to their interests by our governments, State and National; nor can *they*—responsible as they are for the results of supineness and lethargy—be heard with favor in complaints to the public of failures, or of the absence of beneficial results commensurate with the endowment.

Resolved, That as the success of any literary and scientific institution, and more especially the success of a college which, in addition to literature and science, teaching the application of the sciences to the industrial pursuits of life, depends mainly upon the character, standing and administrative ability of the president of the faculty; and that as in the person of Dr. Thomas H. Burrowes, who has lately been called to the responsible position of President of the Agricultural College of Pennsylvania, we recognize the right man in the right place. We do hereby pledge to that institution, as re-organized under the presidency of Dr. Burrowes, our support and our patronage, and commend it to the favor of those we represent.

Resolved, That in view of the provisions of the act of Congress—the money to be refunded for advances made to the educational department on the faith of the endowment, and the necessary current expenses of the college in which no charge is now made for instruction—an annual appropriation, as proposed by the trustees, of two thousand dollars to each of the three several farms, together with the entire net proceeds of four-fifths of each to be farmed for profit and as a model, is not only just but liberal.

Resolved, That the efforts of the State Agricultural Society to secure legislation in behalf of the interest of agriculture in our State, as set forth in their recent memorial to the Legislature, merits the full approval of the public.

Resolved, That we appeal to the Legislature of Pennsylvania, earnestly and confidently, to grant the petition of the State society, believing that legislation in accordance therewith will increase the production of our farms, diminish the cost of labor bestowed on their cultivation, furnish to the public an accurate knowledge of the relation of supply and demand of all farm produce, increase social intercourse, and disseminate more liberal views, more intelligence, more comfort and more happiness among the large class of the people of Pennsylvania.

The report of the Committee on Business concludes by recommending a memorial to the Legislature, asking for aid in the payment of the expenses of a grand trial of implements; for an appropriation to defray the expenses of devising means of utilizing offal, &c., for fertilization; for a law authorizing the gathering of statistics of the products of the State and for general amendment of the road laws of the State.

Dr. Burrowes responded to that resolution of the report favorable to himself, thanking the convention for the compliment paid him. He gave an interesting review of the operations of the State Agricultural College, announcing that he had now some fifty pupils. He wanted no more—the efficiency of the institution might be impaired by any further additions at the present time.

The resolutions were unanimously adopted.

Dr. Burrowes's resolution in reference to a botanical survey of Pennsylvania, after a brief address from the Doctor, was adopted.

Mr. Rhey offered the following resolution:

Resolved, That we urge upon the Legislature the immediate passage of Senate bill, No. 411, relating to roads and bridges.

Adopted—yeas 28, nays 18.

Mr. A. Boyd Hamilton, of Harrisburg, one of the commissioners to the late Cattle Convention at Springfield, Illinois, offered the following resolution:

Resolved, That any system of cumpulsory inspection of live stock by special acts of incorporation is repugnant to the interests of the stock raisers and stock feeders of the State, being expensive and inconvenient and a bar to the free movement of this important portion of our internal commerce, as all the cost of such inspection and extra herding must ultimately fall upon the consumers. Adopted.

Mr. W. H. Holstein, of Montgomery, offered the following resolution:

Resolved, That we memorialize the Legislature to order the publication of the proceedings of this convention in the *Legislative Record*. Adopted.

Mr. Wherry, of Cumberland, offered the following resolution:

Resolved, That the agricultural interests of the State are not proportionately represented in our State and National Legislatures; that this is due to our false and imperfect system of electing representatives. Disagreed to.

Judge Hiester, of Dauphin, moved that the thanks of the convention be tendered to the Representatives for the use of the hall. Agreed to.

Hon. A. B. Longaker, of Lehigh, offered the following resolution:

Resolved, That a committee of three be appointed by the President of this convention, whose duty it shall be to prepare such bills for legislative enactment as in their discretion they may deem necessary to facilitate the agricultural interests in this Commonwealth, a report of whose proceedings shall be made to the State Agricultural Society, which shall present the same to the next Legislature; and it shall be the duty of said committee to invite, by a proper circular addressed to the agricultural societies or institutions of this State, requesting them to suggest any legislation upon such subjects as they may deem important to promote their interests.

Adopted, and Hon. A. B. Longaker, of Lehigh, H. N. M'Allister, of Centre, and A. O. Hiester, of Harrisburg, were appointed.

Judge Park, of Pittsburg, moved a re-consideration of the vote by which the resolution asking the publication of the proceedings of the convention in the *Legislative Record.* Agreed to, and the resolution was then disagreed to.

The convention then adjourned.

The proceedings to be published in the transactions of the Pennsylvania State Agricultural Society, in connection with the minutes of the society, as recorded on the 17th day of March, A. D. 1869.

It is certified that the foregoing is a true record of the proceedings of the State Agricultural Convention, held at Harrisburg, September 17, 1869, in the Hall of the House of Representatives, pursuant to a call of the Pennsylvania State Agricultural Society.

A. B. LONGAKER,
JNO. A. SMULL,
Secretaries.

THE AGRICULTURAL COLLEGE OF PENNSYLVANIA.

INTRODUCTORY STATEMENT.

The following report of the Board of Trustees of the Agricultural College of Pennsylvania, made to the Executive Committee of the Agricultural Society, at their meeting, in March, 1869, will, it is believed, be found interesting, showing, as it does, the moneys at that time realized from the investment of the nine-tenths part of the proceeds of the sales of the Agricultural College land script and the appropriation thereof; the property, real and personal, belonging to the college and the value thereof; the indebtedness of the college, the nature of the liabilities and how they were incurred, and the general condition of the institution, together with the manner in which the remaining one-tenth part of the proceeds of the sales of the Agricultural College land script had been invested, in the establishment of the three several Experimental Farms, under the act of 19th February, 1867.

The synopsis of the reports of the Assistant Professors of Agriculture, resident respectively upon the three several Experimental Farms connected with the college, made for the years 1869 and 1870, will, it is believed, be found not less interesting.

The Executive Committee regret that space could be found in this volume only for the synopsis, and beg leave to refer the reader, for fuller information, to the reports themselves, the value of which cannot be overestimated. It is true that few, very few experimental results have *as yet* been elicited. It is alike true that without many, very many such results no rational, much less reliable, conclusions can be deduced in relation to any of the numerous diversities which mark the programme prescribed by the Board of Trustees. And hence arises the imperative necessity for just such programme touching rotation of crops, and modes of culture; the relative merits of fertilizers, and of grain, seeds and vegetables, upon varieties of soils, under diversity of climate.

To the superficial reader the results reported may seem as unimportant as did the falling of the apple to Newton's companions, reclining under the shade of the tree from which it fell; and yet from that result, confirmed by a thousand other like results, the great philosopher deduced the laws which govern the universe.

To the self-sufficient farmer the diversities which mark the programme prescribed may seem common-place. *He* has tried them all, at least has arrived at a conclusion satisfactory to himself, in relation to them all; and yet it is nevertheless true that our most intelligent agriculturists stand arrayed, in about equal numbers, on either side of almost every one of these diversities.

How can these differences of opinion be reconciled? How can the truth be ascertained? By actual experiments carefully conducted upon the same identical plot, through a series of years, under diversities of climate, differences of season and upon varieties of soil. Nay, more, the results thus conducted, whether successful or unsuccessful, must be minutely ascertained and carefully recorded. And that record must contain the *history of the plot*—a history not only *accessible* but *intelligible* to every reader.

Dr. Burrowes was entirely correct, as touching the three leading objects, not only in assigning paramount importance to rotation of crops and modes of culture, but in enjoining upon his three several assistants strict compliance with the programme prescribed. Without this history what conclusions can be intelligently drawn five, ten or fifteen years hence, in relation to the relative benefits arising from deep and shallow plowing, or rather from the *use* of the common plow alone, and the *combined use* of the common, the sub-soil and the Michigan plows? In relation to the relative merits in the rotation of clover alone—timothy alone and clover and timothy combined? In relation to the relative merits of barley, oats and fallow in the rotation? Of the relative merits of *perfect butt* and end grains for seed corn? Of the relative merits of seed wheat sown at the rates of one, one and one-half and two bushels per acre? Of the relative merits of seed barley, sown at the rates of one, two and three bushels per acre? Of the relative merits of clover and timothy seed sown at the rates of three quarts each, four quarts each and six quarts each per acre? Of the relative merits of planting corn, three stalks at three feet and one stalk at one foot? Of the relative merits of *no lime* contrasted with lime applied at the rates of fifty, one hundred and two hundred bushels per acre? Of the relative merits of *no manure* contrasted with barn-yard manure and the different commercial fertilizers of the market? and of the relative merits for seed of potatoes, small, medium size, large and whole and cut, planted in equal quantities by weight, upon equal areas of lands.

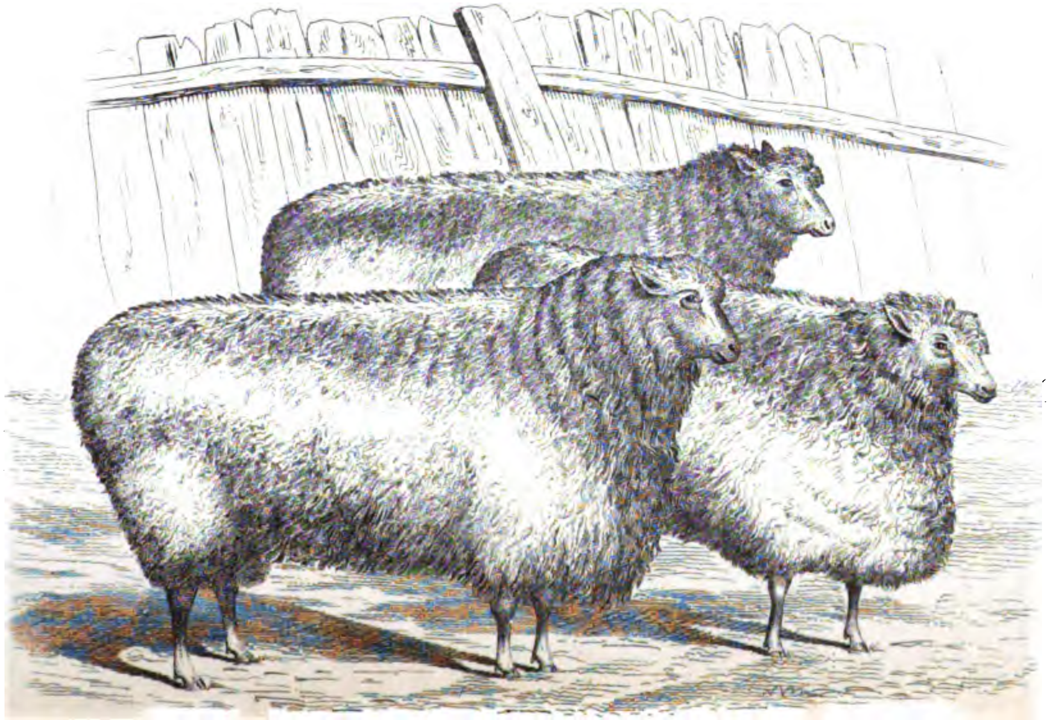
These are among the diversities, the relative merits of which the programme prescribed by the Board are designed to demonstrate, thus laying, like Bacon, the philosophy which bears his name, "*little by little*," yet *deep and broad* the foundation of Agricultural Science.

This foundation, however, must necessarily be the work of years; the work of years upon the Gneiss rock soil of the Eastern farm, upon the limestone soil of the Central farm and upon the red shale and alluvial soil of the Western farm. These three farms having been selected specially with a view to securing the diversity of soils enjoined by the act under which they were purchased, and a portion of the Western farm specially with a view to experiments in drainage. The work of years, too, not in a *roving* culture, *now* of a plot *here*, *then* of a plot there, but of the same identical plot continuously, under the same rotation of crops and modes of culture.

When after the lapse of years, to the scientific conclusions deducible from the facts recorded in the history of the several plots of the programme, shall be added the results of chemical analyses, demonstrating not only the relative fertilizing values of the different manures used upon the plots—the relative *nutrative* properties of *clover*, *timothy* and *other grasses* and *grains*, cut and cured at *different stages of ripeness*, and the numerous other experiments in aid of which agricultural chemistry may be advantageously invoked, we most confidently expect agriculture to be assigned a prominent place among the sciences, promotive of man's greatest welfare.

M.

MAY, 1871.



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To the Executive Committee of the Pennsylvania State Agricultural Society, 1869.

An exhibit of the money received by Moses Thompson, Treasurer of the Agricultural College of Pennsylvania, from the commissioners, as the one-tenth part of the proceeds of the sale of the Agricultural College land script, together with the disposition made thereof under the orders of the Board of Trustees:

Whole amount received		$43,886 50
Paid for Eastern farm, situate near West Grove, Chester county:		
To Thomas M. Harvey, purchase money, per deed,	$17,750 00	
Benjamin J. Passmore, scrivener	10 00	
Recorder of Chester county	2 45	
	17,762 45	
Paid for farm near the College:		
To the Agricultural College of Pennsylvania, per deed	8,000 00	
Recorder of Centre county	2 50	
U. S. revenue stamps	8 00	
Paid for Western farm, situate near Indiana, Indiana county:		
To J. P. Carter, on account, per receipts	13,000 00	
		38,772 95
Money in the hands of Moses Thompson, Treasurer		5,113 55
Yet due J. P. Carter, balance of purchase money, as per original articles of agreement, bearing date 10th December, 1868,		$3,000 00

Although the Board of Trustees approved of the agreement with Carter, in view of the fact reported by the committee that the dwelling house was too small for the comfortable accommodation of an Assistant Professor of Agriculture, his family and employees, the Board continued the committee with instructions to confer with Carter, and to so modify the contract as to require Carter to erect the desired improvement prior to the making of the deed, &c., if in the opinion of the committee the proposed modification could be effected on reasonable terms. The committee conferred with Mr. Carter on the subject, adopted measures to procure a specification and estimate of the proposed improvement, &c., to enable them to contract intelligibly; but up to the time of the hearing before the committee of the Senate, under the resolution of Mr. Lowry, nothing definite had been effected. Since that, however, the original articles of agreement have been modified, as per a supplemental agreement in writing, bearing date 13th March, 1869.

An exhibit of the interest and income received by Edward C. Humes and Moses Thompson, respectively, Treasurers of the Agricultural College of Pennsylvania, from the Commissioners, as the interest of the investment of the nine-tenths of the proceeds of the Agricultural College land script, with the disposition made thereof by order of the Board of Trustees:

By Edward C. Humes, 13th February, 1866.....	$633 00	
Do........do....2d November, 1866.....	543 00	$1,176 00
With which he charged himself in the students' fund account, which was drawn upon only by the president of the college, for the current educational expenses of the college.		
By Moses Thompson, 20th February, 1867......	543 00	
Do.......do.....12th July, 1867...........	5,206 95	
Do.......do......6th August, 1867.......	543 00	6,292 95
Do.......do......8th January, 1868.......	5,027 40	
Do.......do.....12th February, 1868......	7,665 00	
Do.......do......9th July, 1868...........	5,285 38	
Do.......do.....25th August, 1868........	7,665 00	25,642 78
Whole amount received from investment of the proceeds of the land script, up to 1st January, 1869......................................		33,111 73

After the application of the sums received in 1866 and 1867, as above stated, the Board was compelled to incur liabilities to meet the actual current expenses of the educational department in those years, respectively, and the application of the entire sum received in 1868 was required to meet the current expenses of the educational department, pay interest on the sums borrowed the two preceding years, and reimburse of the principal one thousand dollars—all which will appear more fully in other parts of this report.

AN EXHIBIT *of the indebtedness of the Agricultural College of Pennsylvania.*

One hundred bonds, bearing date 31st May, 1866, payable to bearer 1st April, 1876, at the Farmers' and Mechanics' Bank of Philadelphia, with interest at the rate of seven per centum per annum, payable semi-annually at said bank on the first days of October and April in each and every year, sixty thereof in $1,000 each and forty thereof in $500 each	$80,000 00

These bonds are secured by a mortgage of even date to A. O. Hiester and Edward C. Humes, in trust, executed in pursuance of the act of 11th April, 1866, and recorded in Centre county, in Mortgage Book F, page 119, &c.

All these bonds were negotiated by the trustees at par, and the semi-annual instalments of interest which have accrued thereon since their negotiation were paid out of the produce and profits of the farm, the rents and boarding, which, by agreement, constituted portions of the salaries of the professors and tutors, and other sources of revenue than the income from the proceeds of the land script, as follows, to wit:

First instalment, 1st April, 1867	$2,800 00
Second instalment, 1st Oct., 1867	2,800 00
Third instalment, 1st April, 1868	2,800 00
Fourth instalment, 1st Oct., 1868	2,800 00
	11,200 00

The above is the only *bonded* debt of the Agricultural College.

Money was, however, advanced by several friends of the institution to meet the arrears arising from an excess of the expenditures over the receipts of the educational department, as follows:

By James Kelly, 30th October, 1866	$1,000 00
H. N. M'Allister, 2d November, 1866	1,000 00
Hamilton & Hiester, 2d November, 1866	1,000 00
And Edward C. Humes, the Treasurer, at the close of the session which ended in December, 1866, suffered the students' fund to be over-drawn by Dr. W. H. Allen, the President of the college, to meet the pressing current expenses of the educational department	5,097 72
This was done, however, in expectation that two other of the trustees would shortly advance each one thousand dollars, and under an assurance that the balance should be shortly paid, of the receipts from the interest of the land script fund, making the amount borrowed to meet deficits in the fall of 1866	8,097 72

In the fall of 1867, it became necessary for the trustees to borrow more money, to meet a like excess of expenditure by the educational department over the receipts of that year, and this was done as follows, viz:

From James Kelly, 10th Oct., 1867	$4,000 00	
23d " 1867	2,000 00	
Jas. Y. M'Kee, 11th " 1867	1,200 00	
25th " 1867	1,800 00	
		$9,000 00
Making the whole amount borrowed to meet the deficit of 1867		17,097 72

On account of this indebtedness, there has been paid as follows:

To James Kelly, 30th Oct., 1867, interest 1 year,	$60 00	
H. N. M'Allister, 2d Nov., 1867, interest 1 year,	60 00	
Hamilton & Hiester, 2d Nov., 1867, interest 1 year	60 00	
E. C. Humes, interest to 15th Feb., 1868	288 85	
James Kelly....do..........do	120 66	
Jas. Y. M'Kee..do..........do	58 10	
Hamilton & Hiester, interest and principal	15 00	1,000 00
Interest paid	662 61	
Principal due		16,097 72
To which add the bonded debt, as follows		80,000 00
Making the whole unliquidated indebtedness		96,097 72

There is another claim which remains unliquidated, held by Geo. W. Tate, for work done in the erection of the college building. A difference in opinion occurred between Tate and the building committee in relation to the construction of stone walls to protect the windows of the basement story; the removal of the stone, brick, mortar and other rubbish, which in the course of the erection of the walls of the building had well nigh filled the basement story, and numerous other matters. What the contractor refused to do, was done at the expense of the college, by or of the building committee under protest, and the money thus expended is held as defence *pro tanto* to the balance, near $4,000, otherwise due of the contract price.

Amount brought forward	$96,097 72
The settlement of this claim was delayed by a sub-contractor filing a mechanics' lien for upwards of $2,500, to the whole of which Tate set up a defence, but as that dispute has been lately decided in favor of Tate, the way is now open to the ascertainment of the true balance due, which it is supposed three thousand dollars will cover	3,000 00
Making the entire liability of the Agricultural College of Pennsylvania at this date	99,097 72

The personal property of the institution is worth at a low estimate	$20,000 00
The College is the largest, most substantial and best planned college building in the State, and with the professors' houses and farm buildings, cost considerably upwards of $200,000, and could not be now erected for less than	400,000 00
The land is worth	40,000 00
	460,000 00

Having thus shown the "condition of the College financially," it yet remains for us to speak of its "condition otherwise."

The success of literary and scientific colleges, and more especially the success of colleges which in addition to literature and science, teach also the application of the sciences to the industrial pursuits of life, depends mainly upon the character, standing and administrative ability of the president of the faculty.

The trustees hope they have now the right man in the right place, in the person of Thomas H. Burrowes, LL. D.,* of Lancaster—a scholar of rare scientific and literary acquirements—a man of good common sense, and the Trustees hope of good administrative ability—and withal a practical farmer with ten years actual experience. If under the guidance and direction of such a president, properly sustained, success shall not attend the institution, the Trustees may at least be excused in asking to be relieved from any further effort to execute a trust they cannot profitably fill.

Conscious of the rectitude of their intentions, of their industry in the discharge of duty, and of their ardent desire to promote the best interests of the institution, the Trustees might rest upon the above statement of facts.

But they know that they are expected to *account for the want of success*, not to say *failure*, in the past.

Whilst *quack institutions*, assuming the name of colleges, and turning out *graduates* in a fortnight, almost, uniformly attract a crowd of students, higher and more deserving institutions of learning, more liberally befriended and better endowed than the Agricultural College of Pennsylvania, have, not unfrequently, failed; and their embarrassments come in about the proportion in which they have attempted to elevate the standard of education above the wants of the age. This was the rock against which, without intention, and with the utmost good faith in the pilot, the Agricultural College struck in the year 1866.

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*Since deceased.

At the instance and upon the most urgent solicitation of a learned and unanimous faculty, *a most splendid curriculum* was adpoted, requiring a large number of professors and tutors, of which eleven were then actually appointed, constituting a most learned and experienced faculty, which compared favorably with the faculty of any college in the United States, at a cost of eighteen thousand dollars per annum.

To the objection made, that this curriculum would be so expensive as possibly to involve the institution in pecuniary embarrassment, it was answered that the college building just finished, capable of accommodating four hundred students, must be filled; that by multiplying the professors and professorships, enlarging the courses of study, and thus increasing the facilities for imparting knowledge, *students would be attracted, and the institution filled;* that if, with the use of but one-third of the building, the revenue derived from the students and the produce of the farm had well-nigh sustained a president and four professors, with the addition of what was denominated "a magnificent endowment" from the land script, much would be expected; and in that reasonable expectation the public must not be disappointed. The result was a unanimous determination to try the experiment. The curriculum was adopted and published as it appears in the catalogue of 1867, having received the approval of the delegates from the State and county societies at the annual meeting of 1866. Viewed in the light of actual and sad experience, all *now* admit that the *changes* thus made were a great mistake. Whilst they more than *doubled* the expenses of the *educational* department, the number of students gradually decreased from month to month, and from session to session, until July, 1868, when the curriculum was abolished, and the expenses of the educational department so diminished as to allow an annual appropriation of six thousand dollars to the three several experimental farms, (being two thousand dollars to each,) about six thousand dollars to the gradual liquidation of the money advanced and loaned, as above stated, on the credit of the fund, and yet leaving about thirteen thousand dollars for the support of the educational department.

The *failure*, therefore, *so far as relates to students*, is attributable not to the want of facilities for acquiring knowledge, for these were greatly enlarged, but to the high qualifications required to enable the student to enter the lowest of the college classes, and the high standard for graduation after they had entered. A young man fully qualified to have entered the sophomore class at most of our best colleges, had difficulty in entering the freshman at thė Agricultural College of Pennsylvania. A boy with a good common school education was kept more than two years in the preparatory department before he could be admitted to the lowest college class. A most thorough education was thus imparted, but the process seemed to most men too slow for this fast age, and students instead of being attracted were repelled.

And now of the *failure* so far *as relates to the pecuniary embarrassments.*

The institution was exceedingly unfortunate in being placed by the act of 11th April, 1863, in immediate expectation of a large endowment, three years prior to the receipt of a dollar, and five years prior to the receipt of any considerable support from the endowment fund. The public looking upon the college as the recipient of a magnificent endowment at national expense, expected corresponding benefits, and as these did not come, the institution was brought into disrepute.

Although the fund would seem to have been well appropriated by the Legislature on the 11th of April, 1863, to the only institution of learning of a high order in the State, under the control of the industrial classes, designated by Congress in the act as the recipients of their bounty, and although the Trustees by their active and persistent labor and co-operation with the friends of similar institutions in other States, were greatly if not chiefly instrumental in procuring the passage of the act of Congress, yet every possible obstacle was interposed to delay this realization of the benefits of the endowment.

Had the land script been promptly sold, the proceeds promptly invested, and the interest applied as designated in the several acts, the Agricultural College of Pennsylvania would have to-day been free from pecuniary embarrassment, and that, too, notwithstanding the mistake in relation to the curriculum. Instead of this, however, as appears above, no money was realized until 1866, and then but the paltry sum of $1,176 00; in 1867 but $6,293 95; and it was not until 1868 (last year) that the full proceeds of the endowment, $25,642 78, was realized.

Expectations of large inheritance and ample means, without labor, have ruined many others beside the Agricultural College of Pennsylvania. It is the evil genius which for the last year has been hovering over the Eastern Experimental farm.

The Trustees applied to that purpose	$17,762 45
The *pro rata* proportion of the Eastern section of the State for the purchase of that farm would have been	$14,328 83⅓
Making, more than this *pro rata*	3,133 61⅔
	17,762 45

Amount brought forward	$17,762 45
The Trustees required of the citizens of the districts in which the farms were located, both East and West, the stocking and equipment of the farms as a condition of their location at particular places. The citizens of Chester county agreed to do this. It may be estimated at	4,000 00
	21,762 45
It is proposed to farm 20 acres, of the 100 acres in this farm, as *experimental*, and therefore resulting in loss; therefore deduct one-fifth	4,352 25
	17,410 20
Now, if a farm does not show an average net annual profit of about six per cent. on the investment, it should not be set up as a model; we therefore add interest upon the cost of the proportion farmed as a model	$1,044 61
To which add annual appropriation as above	2,000 00
	3,044 61

This to an unbiassed, unprejudiced man would seem a very fair if not a liberal allowance towards the extraordinary expenses of farming twenty acres of land as purely experimental; and yet constant and increasing complaints have come up from the Eastern farm, to the Board of Trustees and to the Legislature for more money. The Trustees, for the reasons stated above, have replied and shall reply that they have not the additional money they ask to give.

The educational department has had a lesson upon the necessity of caution and economy, which we sincerely hope may prove profitable to them. We take the liberty of commending its study to our friends professing interest in the Eastern Experimental Farm.

The citizens of Indiana county agreed to stock the farm located there, and two of her citizens guaranteed the payment of at least three thousand dollars, to be devoted to that object, prior to first April next.

And now as to the Experimental Farm near the college:

FIRST.—*As to the price.*—Eight thousand dollars were paid for one hundred acres of land, all cleared and under cultivation, but without farm buildings. A contract was entered into with George W. Tate for the erection of a house and barn, well adapted to the purposes intended, upon this land, for eight thousand dollars, and that amount was specifically appropriated out of the money then in the treasury, with authority to Hayes

Hamilton and H. N. M'Allister to draw for the same in payment of the contract price as the work progressed.

At the settlement of the Treasurer's account, in January last, it appeared that the contractor had been paid by the Treasurer, upon orders drawn by the committee, $5,860 58, leaving in the Treasurer's hands, applicable thereto upon the completion of the contract, $2,139 42.

The farm near the college, therefore, cost the fund $6,626 33 less than the pro rata, and $9,562 45 less than the Eastern farm.

SECOND.—*As to the equipment.*—It appeared to the Board that after the appropriation of all the stock, farm implements and machinery that could be spared from the college farm, two thousand dollars would be still required to complete that part of the equipment absolutely and indispensably necessary. As the Trustees had no discretion in the location of this farm, the condition imposed upon the citizens of Chester and Indiana could not be imposed upon them, but if it could have been, it would not have been fair to have imposed it, in view of the fact that the citizens of Centre county had already contributed upwards of $32,000 towards the establishment of of the college. Two of her citizens, however, agreed to advance one thousand dollars each, under a proposition made to and accepted by the Board, which it is hoped will result in an absolute gift of the amount to the institution. All of which is most respectfully submitted.

On behalf of the Board of Trustees, by

H. N. M'ALLISTER, Centre co.,
A. BOYD HAMILTON, Dauphin co.,
A. O. HIESTER, Dauphin co.,

Committee of Trustees of the Agricultural College of Pennsylvania.

HARRISBURG, 17th *March*, 1869.

AGRICULTURAL COLLEGE, 1870.

To the Senate and House of Representatives of Pennsylvania; to the Secretary of the Department of the Interior of the United States; the Agricultural Colleges of the United States, and the Pennsylvania State Agricultural Society:

In former reports of this Board, the exact condition of the affairs of the "Agricultural College of Pennsylvania" was set forth with great particularity, and in this, it is proposed to show by the reports from the Experimental Farms in the counties of Chester, Centre and Indiana, with equal particularity, the results arrived at upon them during the year 1869. We will then have placed before the public in these papers, and in publications issued previously to, and since the endowment of the college, a minute exhibit of its transactions and affairs.

The number of students attending the college is constantly increasing. Full information respecting the progress of the Educational Department will be found in the catalogue hereto appended.

The proceeds of the sale of the United States land script have been disbursed by, and the balance permanently invested, as prescribed by the act of Congress, held under an act of the General Assembly by the Surveyor General of Pennsylvania. There has been received, expended and invested as follows:

Endowment United States loan,	$126,000 00, cost........	$132,625 00
Pennsylvania loan..	255,500 00, cost........	262,675 30
Total investment,	381,500 00, cost........	395,300 30
Eastern farm, Chester county..............................		17,750 00
Central farm, Centre county..............................		8,000 00
Western farm, Indiana county..............................		18,136 50
Total product of land script sales....................		439,186 80

About $10,000 have been expended by the public spirited citizens of Chester, Centre and Indiana counties in stocking the farms in their respective localities; and excellent results are expected to follow the working of them under a strict adherence to the well considered formula adopted by the Trustees. Since their acquisition by the Board but one season has passed, and the reports from each farm show how advantageously the time has been utilized. The sum of $6,000 is set apart each year for the conduct of the farms, $2,000 to each, drawn from the revenue derived from the endowment, and 25 acres on each farm for experiments; the remainder of each is to be farmed as model farms.

The receipts of the corporation, from all sources, from January 14, 1869, to January 11, 1870, have been:

From three half yearly payments of interest................	$30,072 00
From students' fund..	3,699 60
From college fund..	217 71
From farm and garden.......................................	729 10
From former superintendent..................................	233 75
From temporary loans..	1,500 00
	36,451 56

Expended as follows:

By former and present superinten't and president,	$25,171 98	
By temporary loans	2,609 16	
By interest on loans	6,228 00	
By State taxes on loans	120 00	
By treasurer's office, probates and stamps	60 95	
By experimental farms	1,519 66	
Balance on hand January 11, 1870	741 81	
		$36,451 56

Considerable sums have been advanced by individuals or obtained by loans, in former years, to sustain the educational department of the college. These obligations are in gradual process of liquidation. As the items have heretofore been made public in various forms, it is not thought necessary to recapitulate them in this exhibit of the transactions of the institution.

All of which is most respectfully submitted, by order of the Board of Trustees.

F. WATTS, *President.*

AGRICULTURAL COLLEGE, *January* 15, 1870.

REPORT OF THE PROFESSOR OF AGRICULTURE.*

To the Board of Trustees of the Agricultural College of Pennsylvania:

The Professor of Agricultural most respectfully reports:—That he has received reports from his several assistants upon the Central, Eastern and Western Model and Experimental Farms, which are herewith submitted and made part of this report; that immediately upon the publication of the programme of the series of experiments prescribed by the Board in March of last year, he transmitted the same to his three several assistants; that in the month of May he delivered them, respectively, books, carefully prepared, containing spaces for the recording of the results, not only upon the 130 plots of the programme prescribed, but spaces sufficiently large for the record of the entire productions of 432 plots for a term of twenty years, and also suitable spaces upon which to compare and contrast the results of the different experiments, with specific instructions in relation to the mode of ascertaining results, recording and reporting the same; that he prepared, and in the month of July, delivered or transmitted by express, to the several superintendents, cast brass numbers for the plots, with specific instructions in relation to the arrangement of them so as to designate distinctly every plot, and yet not in the least interfere with the cultivation thereof by the best and most approved farm implements and machinery, such as the reaper and mower, roller, harrow, &c.; and that in the month of October he delivered or transmitted by mail to the several superintendents a copy of the resolutions passed by the Board, at their September meeting, requiring on or before the 1st day of December, 1869, a specific report:—

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* For a more particular account of the experimental results alluded to in this report reference must be had to the reports of 1869 and 1870. Complete results will not be ready for comparison and publication before 1876.

First.—"As to the results of the experiments made under the programme of the series of experiments prescribed by the Board."

Second.—"As to the results of other experiments, not contained in the programme prescribed."

Third.—"As to the stock furnished to the Eastern farm by the Chester County Agricultural Society and others in the eastern section of the State; to the Western farm by the Indiana County Agricultural Society and others in the western section of the State, and to the Central farm by M'Allister & Beaver, and Thompson, M'Farlane & Co., and others in the central section of the State, *respectively*, its actual cost and present value;" and

Fourth.—"As to the time when the farms were severally established; the products thereof and their value; the expenses of conducting the same; the products sold; the prices and amounts thereof, and the present general condition of the farms respectively."

In the month of November, William C. Huey, Superintendent of the Central farm, handed me his report, which the undersigned is happy to say corresponds with the programme prescribed and with his instructions as Professor of Agriculture, and answers fully to the requirements of the Board. Early in the month of December he received from Thomas P. Walker, Superintendent of the Western farm, his report, which, although somewhat inaccurate and defective, substantially conforms to the requisitions of the Board; and in the latter part of the month of December, and in the beginning of the month of January, he received from Thomas M. Harvey, Superintendent of the Eastern farm, in detached instalments, his report. He is constrained, however, to state that Mr. Harvey's report does not correspond with the programme prescribed by the Board, nor with the instructions given from time to time, as above stated. This is the more deeply to be regretted, as the experiments have evidently been conducted with great care, are exceedingly interesting, and, independent of this disregard of instructions, are reported in a manner highly creditable to the industry and ability of the Superintendent, whose conduct finds *palliation*, if not excuse, in the fact that the committees of the several agricultural clubs in the eastern part of the State, to whom an advisory oversight of the farm had been committed, and who met from time to time thereat, *requested* him to disregard the programme and instructions, and to pursue the same course of experiments adopted on the Eastern farm the first year of its existence, and therefore prior to the establishment of the Central and Western farms. It affords him pleasure, however, to report that a similar disregard of authority is not likely again to occur, and that in the coming year, it is hoped, the *three farms*, so far as relates to the impress made thereon by the Board, will move on in perfect harmony and concert, under the general supervision and control of the central authority, without which the beneficial results of a long continued and well conducted series of experiments can never be attained.

The agriculturist who desires all the information these very interesting experiments afford, will, himself, minutely examine and carefully compare the several reports; but as the general reader and many farmers may not have time and inclination to undertake that labor, there is herewith submitted a synopsis of the three several reports, in which it is endeavored to bring the important results upon each farm into close proximity, that they may be the more readily compared, combined and contrasted.

To a few of the results, thus ascertained and presented, the undersigned begs leave to call special attention—

First, of Corn:

The eleven plots of the Central and the ten plots of the Western farm, plowed with the *subsoil plow*, yield, respectively, a larger product than the eleven and the ten plots plowed only by the common plow. This result is corroborated by the experiments with the subsoil plow upon the Eastern farm, increasing the product there, *over the common plow*, more than *six bushels per acre.*

The one plot, No. 24 of the programme, with one stalk every foot, yielded, upon the Central farm, about ten bushels, and upon the Western farm, two bushels more than plot No. 23, with three stalks every three feet. This experiment is not reported upon the Eastern farm.

The plots of the programme—Central and Western—planted with perfect grains, yielded a greater relative product than those planted with butt and end grains, and the plots planted with *end grains* a larger relative product than the plots planted with butt grains.

These differences are *not marked* and may have resulted from accidental causes, as they seem to vary from the result of similar experiments upon the Eastern farm, in which the only diversity reported is "some evidence of more vitality and better development in the butt end." For any *practical* purpose, the undersigned cannot appreciate the difficulty suggested by the Superintendent of the Eastern farm, arising out of the *pollen* passing from one to the other anywhere in the same field. If such proximity prevents different results, the farmer has nothing to fear from the use of the butt and end grains in connection with the central and perfect grains of the ear.

On the Central farm 100 bushels of lime to the acre would seem better adapted to the soil than 50 or 200 bushels, yet on the whole, no reliable difference in the product is noticeable between the plots limed and the plots not limed, either on the Central or Eastern farm. Indeed, upon the Eastern farm the *lime* seems to have had, if any, an injurious effect, whilst on the Western farm the 50 bushels increases the product 8 bushels, the 100 bushels increases the product 26 bushels, and the 200 bushels increases the product 40 bushels beyond the product of the plots with no lime.

Second, of Spring Barley:

The one bushel of seed barley to the acre yields a larger product, both on the Central and Western farms, than the two and three bushels of seed to the acre. No report of this experiment on barley has been received from the Eastern farm.

The products of the barley plots *limed* are not materially increased over the product of the plots not limed, either upon the Central or the Western farms, although the plots on which the 100 bushels to the acre were applied yielded somewhat more than the plots to which the 50 and the 200 bushels were applied. Neither has this experiment on barley been reported from the Eastern farm.

Three different varieties of spring barley were sown upon the Central farm, five upon the Eastern and one upon the Western. On the Central farm all the varieties were alike productive, yielding, on an average, $31\frac{19}{47}$ bushels to the acre; on the Eastern and Western farms all were alike a failure—the Western farm averaging but $10\frac{24}{47}$ bushels, and the Eastern $11\frac{1}{47}$ bushels per acre.

The Saxonian barley of plot No. 502, on the Central farm, yielded $32\frac{19}{47}$ bushels per acre and was of excellent quality, as it was awarded the premium, both at the fair of the Centre County Agricultural Society, held in Bellefonte, and at the fair of the Pennsylvania State Agricultural Society, held in Harrisburg, whilst the same variety on the Eastern farm, plot 104, produced but $8\frac{2}{47}$ bushels per acre.

Winter Barley.—The largest yield, however, of barley, was on plot No. 105, of the Eastern farm, sown in winter barley, which produced $46\frac{2}{47}$ bushels per acre.

Third, of Oats.—Different varieties:

The two plots, Nos. 105 and 106, of the programme, produced on the Central farm $68\frac{28}{30}$ bushels per acre, and on the Western farm $48\frac{28}{30}$ bushels per acre, and 26 plots on the Eastern farm produced $36\frac{18}{30}$ bushels per acre. Plot 503, of the Central farm, white Schoenen oats, produced $68\frac{18}{30}$ bushels per acre. Plot 23, of the Eastern farm, white Schoenen oats, produced $43\frac{6}{32}$ bushels per acre. Plot 505, of the Central farm, Somerset oats, produced $54\frac{28}{32}$ bushels per acre. Plot 25, of the Eastern farm, Somerset oats, produced $51\frac{6}{32}$ bushels per acre. The Excelsior oats produced upon the Central farm received the premium at the State fair.

Fourth, of Potatoes:

The plots Nos. 11, 16, 116 of the programme, produced upon the Central farm $238\frac{47}{60}$ bushels per acre, and upon the Western farm 198 bushels per acre. The entire plots upon the Central farm produced $200\frac{22}{60}$ bushels per acre. One hundred and twenty-one plots of potatoes upon the Eastern farm produced $125\frac{9}{60}$ bushels per acre.

The Early Goodrich, Harrison, and Early Rose seem to be among the most prolific varieties.

The small whole potatoes where planted in equal quantities by weight or measure, upon the same area of ground with the large and whole and large and cut, uniformly produce the largest yield, and although in the product there are more small potatoes than in that of the large and whole and large and cut, yet there is also more weight of merchantable potatoes.

The four plots 11, 16, 116, and 416, potatoes of the programme prescribed, *subsoiled*, produced, upon the Central farm, $221\frac{34}{60}$ bushels per acre, whilst the two plots, Nos. 216 and 316, plowed only with the *common plow*, produced but $131\frac{44}{60}$ bushels per acre.

A great variety of very interesting and instructive experiments are reported by the Superintendent of the Eastern farm, touching the potato crop. They arise not only from the application of a vast number of fertilizers, but from diversities noted between the different *depths* of planting, the *letting* of all the *sprouts* grow and the *thinning* of them to *three sprouts* in each hill, *the time before planting, of cutting the seed, &c.* Referring to the report itself, and the synopsis of it, for fuller information, it is here simply remarked that about three inches seems to be the most appropriate depth, and that the cutting of the seed any considerable length of time *before* planting, and the thinning of the sprouts, are decidedly injurious. It is here noted that the Superintendent of the Western farm wholly neglected to report the *relative products* of the large and whole, cut, medium and small potatoes, the leading object of the programme touching the potato.

As the Central and Western farms were not established until 1st April, 1869, no *wheat*, of course, was harvested upon their *experimental* plots. The report from the Eastern farm, established 1st April, 1868, contains an interesting exhibit of the results of experiments upon 61 different varieties and 26 different fertilizers. The 61 plots of wheat produced an average of $13\frac{13}{60}$ bushels per acre; plot No. 42, Rough and Ready, produced $37\frac{18}{60}$ bushels per acre; plot No. 32, Weeks White $33\frac{28}{60}$; plot No. 50, Brittany,

$32\frac{57}{60}$ bushels; plot No. 28, white, Blue Stem, $31\frac{8}{60}$ bushels; plot No. 45, red chaff, Mediterranean, $27\frac{16}{60}$ bushels; plot No. 27, Tappahannock, $26\frac{48}{60}$ bushels; plot $51\frac{1}{2}$, Lancaster red, $22\frac{17}{60}$ bushels; plot No. 31, Deihl, $22\frac{16}{60}$ bushels; plot No. 53, Talavera, $11\frac{48}{60}$ bushels; plot 54, rough chaff, $6\frac{54}{60}$ bushels; *thirty-three* plots, upon which 26 different fertilizers were used, produced $26\frac{23}{60}$ bushels per acre; one plot no manure, $18\frac{31}{60}$ bushels. For the relative merits of the different fertilizers, the general reader is referred to the appended synopsis, and the minute investigator to the report itself.

A few interesting experiments were made upon the Central farm with fertilizers upon corn, barley, clover and timothy, the result of which are worthy of special notice. Ter Hoeven horn dust applied to corn in plot 27, at the rate 500 pounds—twenty dollars worth—per acre, produced no sensible effect in raising the product over that of the adjoining plot No. 28; whilst Miller and Smith's superphosphate of lime, applied at the rate of $14 per acre, increased the product of plot No. 39, twenty-two bushels over the product of plot No. 28, and sixteen bushels over the product of plot No. 30, to which barn yard manure had been applied immediately before planting, at the rate of 16 two-horse loads per acre.

On barley, in plot No. 127, Ter Hoeven horn dust, applied at the same rate, increased the product over that of No. 128, on which there was no manure, $4\frac{1}{2}$ bushels, and equalled within a fraction of a bushel Miller and Smith's superphosphate of lime and stable manure applied respectively to plots Nos. 129 and 130. But the most marked result was in the application of these fertilizers to clover and timothy. Ter Hoeven's horn dust applied to plot No. 227, at the rate of 360 pounds per acre—cost $\$14\frac{40}{100}$—produced an increase of 2,080 pounds of dry hay over the product of plot No. 228, on which there was no manure, and Miller and Smith's superphosphate of lime applied to plot No. 229, at the same rate, 360 pounds per acre—costs $10—produced an increase of 2,020 pounds of dry hay over the product of No. 228, on which no manure had been applied. The correctness of this result is greatly strengthened by the fact that plots Nos. 227 and 229 maintain the same relative increase of one ton each over the product of plot No. 130, on which there was also no manure.

Why Ter Hoeven's horn dust, which is undoubtedly a valuable fertilizer, should have produced no beneficial effect upon the corn plot, seems mysterious and inexplicable, and yet it is no more difficult of solution than very many of the results presented by the very intelligent, vigilant and accurate Superintendent of the Eastern farm, who reports having applied to plot No. 62 an application at the rate of 563 pounds of Peruvian guano per acre, at a cost of $\$25\frac{36}{100}$ per acre, without any beneficial effect whatever upon the wheat crop it was applied to nourish. That plot not only falls in the produce of wheat below every one of 32 other plots to which fertilizers were applied, but below plot No. 95, to which no fertilizer was applied, and yet Peruvian guano is known and recognized as a good fertilizer, and is, indeed, made the basis of many of our very best commercial manures.

The most reasonable solution of the difficulty seems to point to the condition of the soil at the time of the application of the fertilizer, the state of the weather at and shortly thereafter, but more specially and particularly to the composition of the fertilizer itself in relation to the rapidity with which it imparts its stimulating and enriching influences to the earth—gypsum (sulphate of lime) and sulphuric acid, and the fertilizers, of which they form a principal ingredient, may be taken as a sample of those fertilizers which impart all the virtue they possess to the first crop, whilst raw bone, especially if not thoroughly pulverized, and Peruvian guano, and the fertilizers of which they form the principal constituents, may be taken as samples of those manures that impart their virtues more slowly, yet not less certainly, to the enrichment of the soil. This idea is very powerfully corroborated and sustained in the results of the application of ten several commercial fertilizers applied to grass on the Eastern farm, upon plots from Nos. 131 to 141, by the Superintendent, in the spring of 1868, reported by him in the harvest of 1868, and also in the harvest of 1869. The virtues of the one class of stimulants were not only exhausted, but the land was left in a worse condition, after the first crop was harvested, than if no fertilizers had been applied. In the light thus cast upon our pathway in starting upon the course of experiments, we are irresistibly led to the conclusion that there is no reliable and certain test of the value of any fertilizer, except the *use of it, and no other*, on the same identical plot, through a series of crops; and for the application of *this test*, provision has been judiciously made in the establishment of the programme of the series of experiments, in which ranges of plots across all the four tiers have been devoted to test the relative merits of fertilizers. But this is not all nor yet the principal benefit arising from the establishment of the programme, which also commends itself to favor, in that the most casual visitor may, by reference to the assistant's book, always open to inspection in the assistant's office, or by reference to the farm ledger, always open to examination in the professor's office, acquaint himself fully with the operations upon the three several experimental farms. He will there find recorded, *what has been* tried, *the manner* in which it has been tried, and the *result.* He will there find what *is being tried*, and with the programme in hand, can, *himself*, and *without a guide*, visit any plot, and there examine *what is growing thereon*, and the programme will fully inform him *what has preceded* and *what is to succeed* the growing crop, and he will there see also *what is yet to be done* and the *manner* in which *it is to be done;* and to the full extent of the programme prescribed, a knowledge of *one farm* is a knowledge of *all.* It is thus that the Professor of Agriculture, at the college near the Central farm, is enabled intelligently to direct and control the operations of all. Much, very much useless expenditure of time and money will thus be saved in lessening the travel of the Professor and his assistants, but more especially in superseding the necessity of the personal presence of the assistants to show visitors the experimental plots, explain their condition, the crops that have preceded, &c. Indeed, it would seem that after farming a few years *experimentally over the entire farm*, as has been done upon the Eastern farm the last two years, results would not only become unreliable, but the complication would necessarily and inevitably become so great as to require a historian's whole time to render the same at all intelligible.

But independent of all such results, the design of the Legislature in the establishment of *three* farms instead of *one*, was to secure the application of *similar tests* under *diversity of soil and climate;* and to effect this, *uniformity* is indispensable.

When the Board prescribe the *essentials of which is to be done*, and the Professor of Agriculture directs *how it is to be done*, the Superintendent has only *to see that it is done in the manner directed.*

At the last exhibition of the Pennsylvania State Agricultural Society the duty was devolved upon the college of testing, at each of the three farms, the relative merits of the fertilizers of Lister & Co., and the Harrisburg Fertilizer Company, on exhibition and in competition for the premium, and for that purpose one ton, made up of several varieties of the manures of their respective manufacture, has been presented by each to the college.

Since that time other manufacturers of mercantile manures have asked to be allowed to compete upon the same terms, which, seeming but just and right, and likely to prove highly beneficial to the agricultural community, their propositions were accepted, and already some of the required contributions have been received, and portions of each have been directed to be forwarded directly to the Superintendent of each farm.

To prevent or expose imposition, it will only be necessary to *purchase*, in the market, similar denominations of the respective fertilizers, to be used side by side with those *donated.*

In concluding this somewhat desultory review, which has been made more from the desire to attract attention to the whole subject than with the expectation of presenting anything like a satisfactory statement of the numerous valuable facts set forth in the reports of the superintendents of the farms, the undersigned would solicit the efforts of the Board to two points which seem to be of essential importance.

The first is—*that strict uniformity in the operations and reports of the experimental portions of all the farms be rigidly enforced.* This is not only proper, for the reasons already assigned, but it is essential in order to effect the intention of the Legislature in their establishment. If experiments are to lead to any reliable results, they must not only be tried in the same manner, and under as great a variety of circumstances as possible, but they must be continued sufficiently long to command confidence by a repetition of similar effects. Single instances, no matter how carefully managed or fully reported, are entitled to little weight. It is only "the like effects always following the like course," that constitutes or proves such a law of nations as may be safely accepted as a guide. In the admirable programme of experiments now going into operation, and which reflects so much credit upon the working portion of the committee which prepared it, a uniformity and scope of operations are provided for which cannot but lead, if sufficiently long and accurately followed, to the most valuable agricultural conclusions; and in the manner of reporting prescribed, when fully adopted, the means will be found of rendering practical all the reliable results thus attained. Owing to the novelty of the enterprise it was, of course, to be expected that some differences of action as well as opinion should exist; but hereafter, to effect success, strict adherence to the plan and the programme is to be *the rule*, and should be *required* by the Board.

The other point is, *that effective means be adopted to put, generally and in a permanent shape, before the public, the annual results of these experiments*, so that, being thus preserved from year to year, and in a condition to be compared with each other as the tests proceed, the intelligent and inquiring farmer may always have the means of watching their progress and forming therefrom his own opinions. This can only be done by means of the press; and as the reports now presented are the first of the series, this is the fitting time to commence the publication. How that is to be done is left to the wisdom of the Board and the public spirit of the Legislature. It may, however, be said that the fact of so few public documents of a strictly agricultural character having been issued at the public expense, makes a claim in behalf of that class for the publication now suggested.

This is eminently and almost exclusively a Pennsylvania undertaking. The plan has no fellows elsewhere so far as the undersigned is informed. If it be properly followed out, and its nature and effects generally made known, so as to be practicalized, it will be another addition to that long list of useful enterprizes and noble institutions which are the pride of our State.

THO. H. BURROWES.

That this report may the more easily be understood, a condensation of a portion of the form of programme of the series of experiments, originally prescribed by the Board, is appended; since the adoption of which, however, one other tier of plots, commencing with 501, up to 601, &c., has been added to test the merits of new and rare varieties of grains, seeds and vegetables, whether of domestic origin or of foreign importation.

AGRICULTURAL COLLEGE, *January*, 1870.

DIRECTORY AND EXPLANATORY REMARKS TO THE SUPERINTENDENTS.

Every plot must contain exactly one-eighth of an acre, with sufficient extra space between the plots to mark and distinguish the one from the other, say twenty-four inches. The space for roads and turns around the several blocks of plots is *twelve feet*. The exact forms of the plots, respectively, must depend upon the form and character of the land or fields in which they are located. The parallelogram, however, is always desirable, and to secure such uniformity, plots bounded by many or unequal lines should generally be excluded from the experimental, and thrown into the ordinary farm. As it is essential that every plot be farmed, unless otherwise directed, with the ordinary and most approved farm implements, such as the plow, self-adjusting and revolving harrow, the roller, the grain drill, the reaper and mower; and as this can be best done on narrow plots of considerable length, where the land will allow, it would seem that twenty rods in length and one rod in width is the form most desirable. Although in some respects desirable, it is not necessary that the experimental plots should be contiguous to each other or even upon the same section of the farm; *it is essential however* that every plot, known and designated by its appropriate number, whatever its situation, *shall have the same rotation of crops and shall be farmed in exact accordance with the impress hereby made upon it.* The *years* in the margin of every batch of plots designate the time when the crop is *gathered or harvested.* Unless, therefore, the batch of plots commencing with 201 be located upon land sown to wheat in the fall of 1868, no wheat can be reaped therefrom in 1869. And unless the batches of plots commencing with 301 and 401, respectively, be located upon land now in clover, timothy, or clover and timothy, no crops can be harvested in 1869. Where nothing is said of the implements, or of the quantity of seed to be used, the ordinary farm implements in approved use, and the usual quantities of seed are implied. "Sub-soil and "Michigan," designate plows to be used. In seeds, lime, &c., the quantity expressed is that applicable to the *acre*, except in potatoes, where the quantity expressed applies alike *to the divisions and to the relative quantities of the seed by weight or measure*, and in corn where the numbers are applied to the *stalks* in *hills three feet apart* and *in rows one foot apart.* The attention of the superintendents is here especially called to the fact that to secure *three stalks* to the hill *five* *grains* should be planted, and that to secure *one stalk to the foot*, *one grain should be planted every six inches*, that it is much easier to *remove* than to *transplant*, but that notwithstanding this precaution, to secure uniformity, some transplanting will probably be necessary, and that this should be done with a transplanting shovel in wet weather, on the first cloudy day after danger from the cut worm has ceased to be apprehended. The application of fertilizers where no specification is made to test the relative qualities thereof, is left to the superintendent of the farms respectively, under the specific and unqualified injunction that in the application special regard shall be had to the crops which by the programme mark diversities and come in competition with each other. The utmost care in such cases must be observed in applying to all the plots, thus placed in competition, the same kind, the same quality, and the same quantity of manure.

LOCATION OF THE FARMS.

EASTERN—Chester county. West Grove P. O.
CENTRAL—Centre county. Agricultural College P. O.
WESTERN—Indiana county. Indiana P. O.

PLOTS.

No. 1, 101, 201, 301, 401.
No. 2, 102, 202, 302, 402. Corn, Subsoil plow. Wheat, Michigan plow.
No. 3, 103, 203, 303, 403.
No. 4, 104, 204, 304, 404. Corn, Subsoil plow. Wheat, Michigan plow.
No. 5, 105, 205, 305, 405.
No. 6, 106, 206, 306, 406. Corn, Subsoil plow. Wheat, Michigan plow.
No. 7, 107, 207, 307, 407.
No. 8, 108, 208, 308, 408. Corn, Subsoil plow. Fallow, Michigan plow.
No. 9, 109, 209, 309, 409.
No. 10, 110, 210, 310, 410. Corn, Subsoil plow. Wheat, Michigan plow.
No. 11, 111, 211, 311, 411. Potatoes, Subsoil plow. Wheat, Michigan plow.
No. 12, 112, 212, 312, 412. Butt grain.
No. 13, 113, 213, 313, 413. Corn, Subsoil plow. Wheat, Michigan plow. Butt grain.

1	1869	1870	1871	1872	1873 ....
1	Corn.	Barley.	Wheat.	Clover.	Clover.
2	Corn.	Barley.	Wheat.	Clover.	Clover.
3	Corn.	Barley.	Wheat.	Timothy.	Timothy.
4	Corn.	Barley.	Wheat.	Timothy.	Timothy.
5	Corn.	Oats.	Wheat.	Clover.	Clover.
6	Corn.	Oats.	Wheat.	Clover.	Clover.
7	Corn.	Fallow.	Wheat.	Clover.	Clover.
8	Corn.	Fallow.	Wheat.	Clover.	Clover.
9	Corn.	Barley.	Wheat.	C. & T.	C. & T.
10	Corn.	Barley.	Wheat.	C. & T.	C. & T.
11	Potatoes.	Barley.	Wheat.	C. & T.	C. & T.

Potatoes seed by weight. ‡ large and whole. ‡ medium size. ‡ small size. ‡ cut.

NOTE.—C. & T., clover and timothy.

PLOTS—CONTINUED.

2	101	102	103	104	105	106	107	108	109	110	111
1869	Barley.	Barley.	Barley.	Barley.	Oats.	Oats.	Fallow.	Fallow.	Barley.	Barley.	Barley.
1870	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.
1871	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1872	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1873	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Potatoes.

3	201	202	203	204	205	206	207	208	209	210	211
1869	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat
1870	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1871	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1872	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Potatoes.
1873	Barley.	Barley.	Barley.	Barley.	Oats.	Oats.	Fallow.	Fallow.	Barley.	Barley.	Barley.

4	301	302	303	304	305	306	307	308	309	310	311
1869	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1870	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1871	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Potatoes.
1872	Barley.	Barley.	Barley.	Barley.	Oats.	Oats.	Fallow.	Fallow.	Barley.	Barley.	Barley.
1873	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.

5	401	402	403	404	405	406	407	408	409	410	411
1869	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.
1870	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Corn.	Potatoes.
1871	Barley.	Barley.	Barley.	Barley.	Oats.	Oats.	Fallow.	Fallow.	Barley.	Barley.	Barley.
1872	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.	Wheat.
1873	Clover.	Clover.	Timothy.	Timothy.	Clover.	Clover.	Clover.	Clover.	C. & T.	C. & T.	C. & T.

NOTE.—C. & T., clover and timothy.

The plots have been farmed in conformity with this schedule from the start on the Western and Central farms. The Eastern farm will comply with the formula hereafter.

The series of experiments were originally intended to extend over 5 years. It is supposed it will require until 1876 to complete them as thoroughly as their importance demands.

CENTRAL, WESTERN AND EASTERN EXPERIMENTAL FARMS.

Synopsis of the Reports of the Superintendents to 1st December, 1869.

Corn.—Central and Western Farms.

Central.—The 24 plots—corn of the programme prescribed—yield 12,902 pounds—equal to 122 33.35 bushels of ears per acre.

Western.—The 22 plots—corn of the programme prescribed—yield 7,035 pounds—equal to 73 3.35 bushels of ears per acre.

Central.—The 11 plots—corn of the programme subsoiled—yield 6,002 pounds—equal to 125 8.35 bushels of ears per acre.

Western.—The 10 plots—corn of the programme subsoiled—yield 3,220 pounds—equal to 73 21.35 bushels of ears per acre.

Central.—The 11 plots—corn of the programme—common plow—yield 5,848 pounds—equal to 121 18.35 bushels of ears per acre.

Western.—The 10 plots—corn of the programme—common plow—yield 3,001 3.8 pounds—equal to 68 21.35 bushels of ears per acre.

Central.—The 1 plot—24—corn of the programme—1 stalk every foot—yield 548 pounds—equal to 125 9.35 bushels of ears per acre.

Western.—The 1 plot—24—corn of the programme—1 stalk every foot—yield 411 2.8 pounds—equal to 94 bushels of ears per acre.

Central.—The 1 plot—23—corn of the programme—3 stalks every 3 feet—yield 506 pounds—equal to 115 24.35 bushels of ears per acre.

Western.—The 1 plot—23—corn of the programme—3 stalks every 3 feet—yield 402 pounds—equal to 92 bushels of ears per acre.

Central.—The 20 plots—corn of the programme—perfect grains—yield 10,777 pounds—equal to 123 7.35 bushels of ears per acre.

Western.—The 18 plots—corn of the programme—perfect grains—yield 6,011 2.8 pounds—equal to 76 11.35 bushels of ears per acre.

Central.—The 2 plots—12 and 13—corn of the programme—butt grains—yield 1,055 pounds—equal to 120 bushels of ears per acre.

Western.—The 2 plots—12 and 13—corn of the programme—butt grains—yield 481 2.8—equal to 55 bushels of ears per acre.

Central.—The 2 plots—14 and 15—corn of the programme—end grains—yield 1,070 pounds—equal to 122 bushels of ears per acre.

Western.—The 2 plots—14 and 15—corn of the programme—end grains—yield 542 4.8 pounds—equal to 62 bushels of ears per acre.

Central.—The 2 plots—25 and 26—corn of the programme—no lime—yield 1,088 pounds—equal to 124 12.35 bushels of ears per acre.

Western.—The 16 plots—corn of the programme—no lime—yield 4,655 pounds—equal to 66 bushels of ears per acre.

Central.—The 2 plots—17 and 18—corn of the programme—lime, 50 bushels—yield 1,032 pounds—equal to 117 33.35 bushels of ears per acre.

Western.—The 2 plots—17 and 18—corn of the programme—lime, 50 bushels—yield 647 4.8 pounds—equal to 74 bushels of ears per acre.

Central.—The 2 plots—19 and 20—corn of the programme—lime, 100 bushels—yield 1,121 pounds—equal to 128 4.35 bushels of ears per acre.

Western.—The 2 plots—19 and 20—corn of the programme—lime, 100 bushels—yield 805 pounds—equal to 92 bushels of ears per acre.

Central.—The 2 plots—21 and 22—corn of the programme—lime, 200 bushels—yield 1,016 pounds—equal to 116 4.35 bushels of ears per acre.

Western.—The 2 plots—21 and 22—corn of the programme—lime, 200 bushels—yield 927 pounds—equal to 106 bushels of ears per acre.

Corn.—Eastern Farm—Different Fertilizers.

Thirty-eight plots—corn—from 299 to 336—yield 18,596 7.8 pounds—equal to 111 27.35 bushels of ears per acre.

Six plots—corn—299, 302, 306, 308, 310 and 327—no fertilizers—yield 2,977 6.8 pounds—equal to 113 15.35 bushels per acre.

Thirty-two plots—corn—residue of the 38 plots—with fertilizers—yield 15,619 1.8—equal to 111 19.35 bushels of ears per acre.

Three plots—corn—305, 307 and 309—limed—yield 1,114 5.8—equal to 84 32.35 bushels of ears per acre.

Three plots—corn—306, 308 and 310—not limed—yield 1,210 4.8—equal to 92 8.35 bushels of ears per acre.

One plot—305—corn—lime, 100 bushels per acre—yield 337 2.8 pounds—equal to 77 3.35 bushels of ears per acre.

One plot—306—corn—lime, none—yield 358 4.8 pounds—equal to 81 33.35 bushels of ears per acre.

One plot—307—corn—lime, 50 bushels per acre—yield 349½ pounds—equal to 79 28.35 bushels of ears per acre.

One plot—308—corn—lime, none—yield 348 pounds—equal to 79 19.35 bushels of ears per acre.

One plot—309—corn—lime, 200 bushels per acre—yield 428 2.8 pounds—equal to 97 31.35 bushels of ears per acre.

One plot—310—corn—lime, none—yield 504 pounds—equal to 115 7.35 bushels of ears per acre.

Three plots—299, 303 and 327—corn—no fertilizers—yield 1,767 2.8 pounds—equal to 137 17.35 bushels of ears per acre.

One plot—300—corn—Moro Philips' phosphate, 400 pounds—yield 551 6.8 pounds—equal to 126 4.35 bushels of ears per acre.

One plot—301—corn—9 ox-cart loads of stable manure on sod, summer of 1868—yield 762 pounds—equal to 174 6.35 bushels of ears per acre.

One plot—302—corn—9 ox-cart loads of stable manure on sod, just before plowing—yield 630 3.8 pounds—equal to 144 3.35 bushels of ears per acre.

One plot—303—corn—no fertilizer—yield 634 pounds—equal to 144 33.35 bushels of ears per acre.

One plot—304—corn—Moro Philips' phosphate, 150 pounds per acre, drilled with seed—yield 687 6.8 pounds—equal to 157 7.35 bushels of ears per acre.

One plot—311—corn—Whann's phosphate, $7 91 per acre—yield 564 pounds—equal to 128 32.35 bushels of ears per acre.

One plot—312—corn—Bower—yield 568 pounds—equal to 124 4.35 bushels of ears per acre.

One plot—313—corn—Hewes—yield 568 pounds—equal to 124 4.35 bushels of ears per acre.

One plot—314—corn—National—yield 504 pounds—equal to 115 1.35 bushels of ears per acre.

One plot—315—corn—Baugh's raw bone phosphate—yield 530 pounds—equal to 121 5.35 bushels of ears per acre.

One plot—316—corn—Miller & Smith's—yield 568 pounds—equal to 124 4.35 bushels of ears per acre.

One plot—325—corn—Moro Philips'—yield 608 pounds—equal to 138 34.35 bushels of ears per acre.

Corn.—Eastern Farm.—Deep and Shallow Plowing.

Twenty-eight divisions, of 20 hills each, making 560 hills, 4 inches deep; common plow—yield 475 pounds—equal to 13 20.35 bushels.

Twenty-eight divisions, of 20 hills each, making 560 hills, 7 inches deep; common plow—yield 463 pounds—equal to 13 8.35 bushels.

Twenty-eight divisions, of 20 hills each, making 560 hills, 11 inches deep; Double Michigan—yield 485 pounds—equal to 13 30.35 bushels.

Twenty-eight divisions, of 20 hills each, making 560 hills, 16 inches deep; subsoil plow—yield 512 6.8 pounds—equal to 14 22.35 bushels.

Central and Western Farms.—Spring Barley, Common Four-Rowed.

Central.—The 21 plots—barley of the programme prescribed—yield 3,872 4.8 pounds—equal to 31 10.47 bushels per acre.

Central.—The 12 plots—barley of the programme specifically reported—yield 1,298 2.8 pounds—equal to 31 12.47 bushels per acre.

Western.—The 12 plots—barley of the programme—yield 1,298 2.8 pounds—equal to 10 24.47 bushels per acre.

Different Qualities of Seed per Acre.

Central.—The 10 plots—barley of the programme—seed 2 bushels per acre—yield 1,836 pounds—equal to 30 bushels per acre.

Western.—The 19 plots—barley of the programme—seed 2 bushels per acre—yield 1,200 2.8 pounds—equal to 10 35.47 bushels per acre.

Central.—The 1 plot—123—barley of the programme—seed 1 bushel per acre—yield 185 4.8 pounds—equal to 31 22.47 bushels per acre.

Western.—The 1 plot—123—barley of the programme—seed 1 bushel per acre—yield 49 4.8 pounds—equal to 8 12.47 bushels per acre.

Central.—The 1 plot—124—barley of the programme—seed 3 bushels per acre—yield 178 pounds—equal to 30 14.47 bushels per acre.

Western.—The 1 plot—124—barley of the programme—seed 3 bushels per acre—yield 48 4.8 pounds—equal to 8 12.47 bushels per acre.

Different Qualities of Lime per Acre.

Central.—The 2 plots—117, 118—barley of the programme—lime 50 bushels—yield 337 pounds—equal to 28 32.47 bushels per acre.

Western.—The 2 plots—117, 118—barley of the programme—lime 50 bushels—yield 123 pounds—equal to 10 24.47 bushels per acre.

Central.—The 2 plots—119, 120—barley of the programme—lime 100 bushels—yield 375 5.8 pounds—equal to 31 45.47 bushels per acre.

Western.—The 2 plots—119, 120—barley of the programme—lime 100 bushels—yield 146 pounds—equal to 12 20.47 bushels per acre.

Central.—The 2 plots—121, 122—barley of the programme—lime 200 bushels—yield 347 2.8 pounds—equal to 29 26.47 bushels per acre.

Western.—The 2 plots—121, 122—barley of the programme—lime 200 bushels—yield 131 4.8 pounds—equal to 11 9.47 bushels per acre.

Central.—The 2 plots—125, 126—barley of the programme—lime none—yield 373 4.8 pounds—equal to 31 37.47 bushels per acre.

Western.—The 15 plots—barley of the programme—lime none—yield 897 2.8 pounds—equal to 10 8.47 bushels per acre.

New Varieties of Foreign Importation.

Central.—The 1 plot—502—Saxonian barley—yield 193 pounds—equal to 32 40.47 bushels per acre.

Central.—The 1 plot—504—Probstier barley—yield 170 pounds—equal to 28 44.47 bushels per acre.

Eastern Farm.—Common and New Varieties of Barley.

Five plots—100, 101, 102, 103 and 104—yield 324 pounds—equal to 11 1.47 bushels per acre.

One plot—100—Common two rowed barley—yield 111 pounds—equal to 18 42.47 bushels per acre.

One plot—101—Nonpareil barley—yield 47 4.8 pounds—equal to 9 37.47 bushels per acre.

One plot—102—California barley—yield 39 2.8 pounds—equal to 6 32.47 bushels per acre.

One plot—103—Probstier barley—yield 76 4.8 pounds—equal to 13 1.47 bushels per acre.

One plot—104—Saxonian barley—yield 49 6.8 pounds—equal to 8 22.47 bushels per acre.

Barley.—Eastern Farm.

One plot—105—Winter barley—yield 275 4.8—equal to 46 2.47 bushels per acre.

Oats.—Different Varieties—Product per Acre of the Farms respectively.

Central.—The 2 plots—105, 106—oats of the programme prescribed—yield 517 pounds—equal to 68 28.30 bushels per acre.

Western.—The 2 plots—105, 106—oats of the programme prescribed—yield 338 pounds—equal to 45 2.30 bushels per acre.

Central.—3 plots—105, 106, 501—Excelsior oats—yield 754 pounds—equal to 67 3.30 bushels per acre.

Central.—1 plot—503—White Schoenen oats—yield 257 pounds—equal to 68 16.30 bushels per acre.

Central.—1 plot—505—Somerset oats—yield 206 pounds—equal to 54 28.30 bushels per acre.

Eastern.—Twenty-six plots—from 1 to 26, both inclusive—yield 3,564 5.8 pounds—equal to 36 16.30 bushels per acre.

Eastern.—1 plot—23—White Schoenen oats—yield 162 pounds—equal to 43 6.30 bushels per acre.

Eastern.—1 plot—25—Somerset oats—yield 192 pounds—equal to 51 6.30 bushels per acre.

Potatoes.—Different Varieties and Modes of Preparing the Seed.

Central.—The one-fourth of the 1 plot—11—potatoes of the programme—cut—Early Goodrich—yield 500 pounds—equal to 285 40.56 bushels per acre.

Central.—The one-fourth of the 1 plot—11—potatoes of the programme—large and white—Early Goodrich—yield 410 pounds—equal to 234 16.56 bushels per acre.

Central.—The one-fourth of the 1 plot—11—potatoes of the programme—medium—Early Goodrich—yield 419 pounds—equal to 239 24.56 bushels per acre.

Central.—The one-fourth of the 1 plot—11—potatoes of the programme—small—Early Goodrich—yield 486 pounds—equal to 277 40.56 bushels per acre.

Western.—The 1 plot—11—potatoes of the programme—cut—large and whole—medium and small—yield 1,498 pounds—equal to 214 bushels per acre.

Central.—The one-half of the 2 plots—16, 116—potatoes of the programme—cut—Harrison—yield 1,531 pounds—equal to 218 40.56 bushels per acre.

Western.—The 1 plot—16—potatoes of the programme—cut and large and white—yield 1,428 pounds—equal to 204 bushels per acre.

Central.—The one-half of the 2 plots—16, 116—potatoes of the programme—large and whole—Harrison—yield 1,670 pounds—equal to 238 32.56 bushels per acre.

Western.—The 1 plot—116—potatoes of the programme—cut and large and whole—yield 1,288 pounds—equal to 184 bushels per acre.

Central.—The one-half of the one plot—216—potatoes of the programme—cut—Red Utica—yield 400 pounds—equal to 114 16.56 bushels per acre.

Western.—No report on 12 plots following.

Central.—The one-half of the one plot—216—potatoes of the programme—large and whole—Red Utica—yield 420 pounds—equal to 120 bushels per acre.

Central.—The one-half of the 1 plot—316—potatoes of the programme—cut—White Utica—yield 505 pounds—equal to 144 16.56 bushels per acre.

Central.—The one-half of the 1 plot—316—potatoes of the programme—large and white—White Utica—yield 520 pounds—equal to 148 23.56 bushels per acre.

Central.—The seed potatoes of the Central farm, on all the plots, was at the rate of 16 bushels per acre.

Central.—The one-half of the one plot—416—potatoes of the programme—medium—White Utica—yield 585 pounds—equal to 167 8.56 bushels per acre.

Central.—The one-half of the one plot—416—potatoes of the programme—small—White Utica—yield 600 pounds—equal to 171 24.56 bushels per acre.

Combined Diversity Between Sub-soil and Common Plowing.

Central.—The 4 plots—11, 16, 116 and 416—potatoes of the programme—sub-soil plow—yield 6,200 pounds—equal to 221 24.56 bushels per acre.

Central.—The 2 plots—216 and 316—potatoes of the programme—common plow—yield 1,845 pounds—equal to 131 14.56 bushels per acre.

Combined Diversities Between Small, Medium, Large and Whole and Cut Seed.

Central.—The two fractions of the 2 plots planted with small potatoes contain 15 perches—yield 1,086 pounds—equal to 206 48.56 bushels per acre.

Central.—The two fractions of the 2 plots planted with medium potatoes contain 15 perches—yield 1,004 pounds—equal to 191 bushels per acre.

Central.—The five fractions of the 5 plots planted with large and whole potatoes contain 45 perches—yield 3,020 pounds—equal to 191 41.56 bushels per acre.

Central.—The five fractions of the 5 plots planted with cut potatoes contain 45 perches—yield 2,936 pounds—equal to 186 23.56 bushels per acre.

Central.—Two two-horse loads of barn-yard manure were applied to each of the 5 plots in potatoes—equal to 16 loads per acre; and 2 bushels—equal to 112 pounds seed, were planted on every plot—equal to 16 bushels per acre.

Western.—No report.

Eastern Farm—Early Potatoes—Different Varieties and Manures.

Twenty-four plots—from 146 to 169—16 varieties potatoes—yield 14,236 6.8 pounds—equal to 84 21.56 bushels per acre.

Sixteen plots—from 146 to 161—16 varieties potatoes—12 loads stable manure per acre—yield 10,587 4.8 pounds—equal to 94 29.56 bushels per acre.

Eight plots—from 161 to 169—8 varieties potatoes—988 pounds Moro

Philips' phosphate per acre—yield 3,649 2.8 pounds—equal to 65 9.56 bushels per acre.

One plot—146—Early Goodrich—stable manure as above—yield 1,072 4.8 pounds—equal to 153 12.56 bushels per acre.

One plot—167—Early Goodrich—Moro Philips' phosphate as above—yield 484 pounds—equal to 69 8.56 bushels per acre.

One plot—150—Early Rose—stable manure as above—yield 1,039 4.8 pounds—equal to 148 28.56 bushels per acre.

One plot—166—Early Rose—Moro Philips' phosphate as above—yield 657 2.8 pounds—equal to 93 50.56 bushels per acre.

Eastern Farm—Different Fertilizers and Sizes of Seed.

Seventeen plots—from 170 to 186—Moro Philips' phosphate, $17 25.100 per acre—yield 17,378 4.8 pounds—equal to 146 2.56 bushels per acre.

Seventeen plots—from 187 to 203—stable manure, 11 ox-cart loads per acre—yield 15,864 4.8 pounds—equal to 133 17.56 bushels per acre.

One plot—170—Monitors—large and whole seed, 19 2.8 pounds—Moro Philips' phosphate, $17 25 per acre—yield 1,174 2.8—equal to 167 44.56 bushels per acre.

One plot—171—Monitors—large and cut seed, 8 1.2 pounds—Moro Philips' phosphate, $17 25 per acre—yield 1,130 pounds—equal to 161 24.56 bushels per acre.

One plot—174—Monitors—medium and whole seed—17½ pounds—Moro Philips' phosphate, $17 25 per acre—yield 1,201 6.8 pounds—equal to 171 38.56 bushels per acre.

One plot—175—Monitors—medium and cut seed, 8 pounds—Moro Philips' phosphate, $17 25 per acre—yield 1,042 2.8 pounds—equal to 148 50.56 bushels per acre.

One plot—176—Monitors—small and whole seed, 7½ pounds—Moro Philips' phosphate, $17 25 per acre—yield 984 4.8 pounds—equal to 140 36.56 bushels per acre.

One plot—177—Monitors—large and whole seed, 20 pounds—Moro Phillips' phosphate, $17 25 per acre—yield 1,097 4.8 pounds—equal to 156 44.56 bushels per acre.

One plot—178—Monitors—small seed, 20 pounds—Moro Philips' phosphate, $17 25 per acre—yield 1,223 6.8 pounds—equal to 174 46.56 bushels per acre.

One plot—187—Monitors—large and whole seed, 15 pounds—stable manure, 11 cart-loads per acre—yield 860 6.8 pounds—equal to 122 54.56 bushels per acre.

One plot—188—Monitors—large and cut seed, 8 pounds—stable manure, 11 cart-loads per acre—yield 888 2.8 pounds—equal to 126 54.56 bushels per acre.

One plot—191—Monitors—medium and whole seed, 16 pounds—stable manure, 11 cart-loads per acre—yield 998 2.8 pounds—equal to 142 34.56 bushels per acre.

One plot—192—Monitors—medium and cut seed, 8 pounds—stable manure, 11 cart-loads per acre—yield 844 2.8 pounds—equal to 121 bushels per acre.

One plot—193—Monitors—small and whole seed, 9½ pounds—stable manure, 11 cart-loads per acre—yield 896 4.8 pounds—equal to 128 4.56 bushels per acre.

One plot—195—Monitors—large and whole seed, 14½ pounds—stable manure, 11 cart-loads per acre—yield 836 pounds—equal to 119 24.56 bushels per acre.

One plot—196—Monitors—small and whole seed, 14½ pounds—stable manure, 11 cart-loads per acre—yield 1,001 pounds—equal to 143 bushels per acre.

Eastern Farm—Diversity Between Letting all Sprouts Grow and Thinning to Three in Each Hill—Different Fertilizers.

One plot—208—Monitors—large and whole seed, 21½ pounds—not thinned—Moro Philips—yield 1,174 2.8 pounds—equal to 167 42.56 bushels per acre.

One plot—209—Monitors—large and whole seed, 23 pounds—thinned—Moro Philips—yield 1,042 2.8 pounds—equal to 149 4.56 bushels per acre.

One plot—210—Monitors—large and whole seed, 15 pounds—not thinned—stable manure—yield 860 6.8 pounds—equal to 123 50.56 bushels per acre.

One plot—211—Monitors—large and whole seed, 14½ pounds—thinned—stable manure—yield 838 6.8 pounds—equal to 119 46.56 bushels per acre.

Eastern Farm—Diversity Between Size of Product Between Large and Small Seed.

One plot—195—Monitors—large and whole seed, 14½ pounds—yield, cullings, 11 pounds—second class, 132 pounds—extra fine, 704 pounds.

One plot—196—Monitors—small and whole seed, 14½ pounds—yield, cullings, 17½ pounds—second class, 338 2.8 pounds—extra fine, 662 6.8 pounds.

Eastern Farm—Diversities Arising from Different Depths of Planting.

One plot—214—Monitors—stable manure—cut—2 inches deep—yield 767 2.8 pounds—equal to 109 34.56 bushels per acre.

One plot—215—Monitors—stable manure—cut—7 inches deep—yield 530 6.8 pounds—equal to 75 46.56 bushels per acre.

One plot—216—Monitors—stable manure—cut—3½ inches deep—yield 814 pounds—equal to 117 40.56 bushels per acre.

One plot—217—Monitors—Moro Philips' phosphate—cut—2 inches deep—yield 715 pounds—equal to 102 8.56 bushels per acre.

One plot—218—Monitors—Moro Philips' phosphate—cut—7 inches deep—yield 464 6.8 pounds—equal to 62 46.55 bushels per acre.

One plot—219—Monitors—Moro Philips' phosphate—cut—3½ inches deep—yield 624 2.8 pounds—equal to 89 10.56 bushels per acre.

Potatoes—Eastern Farm—Diversities from time of Cutting the Seed Potatoes.

Eastern.—1 plot—222—Monitors—cut two weeks before planting—yield 580 pounds—equal to 82 48.56 bushels per acre.

Eastern.—1 plot—223—Monitors—cut at time of planting—yield 819 pounds—equal to 117 bushels per acre.

Eastern.—1 plot—220—Early Shaw—cut two weeks before planting—yield 764 4.8 pounds—equal to 100 12.56 bushels per acre.

Eastern.—1 plot—221—Early Shaw—cut at time of planting—yield 907 4.8 pounds—equal to 129 36.56 bushels per acre.

Fertilizers, Commercial $17 25—*Stable Manure,* 11 *Ox-cart Loads per acre.*

Eastern.—29 plots—from 224 to 254, both inclusive—29 varieties—yield 26,315 6.8 pounds—equal to 129 7.56 bushels per acre.

Eastern.—1 plot—236—no manure—yield 745 2.8 pounds—equal to 106 26.56 bushels per acre.

Eastern.—1 plot—249—no manure—yield 583 pounds—equal to 83 16.56 bushels per acre.

Eastern.—1 plot—234—Whann—the most productive—yield 1,204 4.8 pounds—equal to 172 6.56 bushels per acre.

Eastern.—1 plot—251—Peruvian guano and plaster mixed—the least productive—yield 600 7.8 pounds—equal to 85 47.56 bushels per acre.

Eastern.—1 plot—254—Moro Phillips' phosphate—701 2.8 pounds—equal to 100 10.56 bushels per acre.

Eastern.—1 plot—233—Miller & Smith's phosphate of lime—1,009 2.8 pounds—equal to 144 10.56 bushels per acre.

Eastern.—1 plot—243—stable manure—819 4.8 pounds—equal to 117 38.56 bushels per acre.

Thirty-two Varieties Potatoes—Stable Manure, 11 *Ox-cart Loads per acre.*

Eastern.—32 plots—from 259 to 290—stable manure—yield 17,203 6.8 pounds—equal to 76 54.56 bushels per acre.

Eastern.—1 plot—279—Harrison—most productive—yield 1,295 2.8 pounds—equal to 185 2.56 bushels per acre.

Eastern.—8 plots—from 274 to 290—stable manure—yield 6,363 2.8 pounds—equal to 113 35.56 bushels per acre.

Eastern.—8 plots—from 291 to 298—same varieties—Moro Philips' phosphate, $17 25 per acre—yield 5,481 4.8 pounds—equal to 97 49.56 bushels per acre.

Corn.—Central Farm—Fertilizers upon Corn.

Central.—Plot 27—Ter Hœven's horn dust—62½ pounds—equal to 500 pounds per acre, cost $20—yield 440 pounds—equal to 100 23.35 bushels ears per acre.

Central.—Plot 28—no manure—yield 440 pounds—equal to 100 23.35 bushels ears per acre.

Central.—Plot 29—Miller & Smith's superphosphate of lime—62½ pounds—500 pounds per acre—cost $14—yield 535 pounds—equal 122 10.35 bushels ears per acre.

Central.—Plot 30—barn-yard manure—2 two-horse loads—equal to 16 loads per acre—yield 465 pounds—equal to 106 10.35 bushels ears per acre.

Fertilizers upon Barley—Common Four-Rowed.

Central.—Plot 127—Ter Hœven's horn dust—62½ pounds—equal to 500 pounds per acre—cost $20—yield 185 pounds—equal to 31 23.47 bushels per acre.

Central.—Plot 128—no manure—yield 160 pounds—equal to 27 1.47 bushels per acre.

Central.—Plot 129—Miller & Smith's superphosphate of lime—62½ pounds—equal to 500 pounds per acre—cost $14—yield 188 pounds—equal to 32 bushels per acre.

Central.—Plot 130—barn-yard manure—2 two-horse loads—equal to 16 loads per acre—yield 197 pounds—equal to 33 bushels per acre.

Fertilizers upon Clover and Timothy.

Central.—Plot 227—Ter Hœven's horn dust—45 pounds—equal to 360 pounds per acre—cost $14 40—yield 740 pounds—equal to 2 tons 1,920 pounds per acre.

Central.—Plot 228—no manure—yield 480 pounds—equal to 1 ton 1,840 pounds per acre.

Central.—Plot 229—Miller & Smith's superphosphate—45 pounds—equal to 360 pounds per acre—cost $10 28—yield 720 pounds—equal to 2 tons 1,860 pounds per acre.

Central.—Plot 230—no manure—yield 490 pounds—equal to 1 ton 1,920 pounds per acre.

Eastern Farm—Fertilizers upon Oats—Black Hungarian.

Eastern.—Plot 4—Moro Philips' phosphate—100 pounds—equal to 800 pounds per acre—yield 163 2.8 pounds—equal to 43 18.30 bushels per acre.

Eastern.—Plot 5—no manure—yield 135 pounds—equal to 36 3.30 bushels per acre.

WHEAT.

The Eastern Farm established 1st April, 1868, was one full year in advance of the Central and Western, which did not go into operation until 1st April, 1869. No wheat was therefore harvested upon the Experimental plots of either of the latter in 1869.

Different Varieties.

Eastern.—61 plots—wheat—61 varieties—yield 6,046 3.8 pounds—equal to 13 13.60 bushels per acre.

Eastern.—1 plot—42—wheat—Rough and Ready—yield 279 7.8 pounds—equal to 37 19.60 bushels per acre.

Eastern.—1 plot—32—wheat—Week's White—yield 250 3.8 pounds—equal to 33 23.60 bushels per acre.

Eastern.—1 plot—50—wheat—Brittany—yield 247⅛ pounds—equal to 32 57.60 bushels per acre.

Eastern.—1 plot—28—wheat—White Blue Stem—yield 233 4.8 pounds—equal to 31 8.60 bushels per acre.

Eastern.—1 plot—34—wheat—Extra Early Jersey—yield 238 4.8 pounds—equal to 30 28.60 bushels per acre.

Eastern.—1 plot—30—wheat—Witter—yield 217 2.8 pounds—equal to 28 58.60 bushels per acre.

Eastern.—1 plot—38—wheat—Rues Amber—yield 221 4.8 pounds—equal to 29 32.60 bushels per acre.

Eastern.—1 plot—45—wheat—Red Chaff Mediterranean—yield 206 pounds—equal to 27 28.60 bushels per acre.

Eastern.—1 plot—51—wheat—French Red Chaff—yield 204 4.8 pounds—equal to 27 16.60 bushels per acre.

Eastern.—1 plot—27—wheat—Tappahannock—yield 202 pounds—equal to 26 56.60 bushels per acre.

Eastern.—1 plot—41—wheat—Treadwell—yield 201 pounds—equal to 26 48.60 bushels per acre.

Eastern.—1 plot—44—wheat—White Chaff Mediterranean—yield 201 pounds—equal to 26 48.60 bushels per acre.

Eastern.—1 plot—51½—wheat—Shade Mountain White—yield 185 4.8 pounds—equal to 24 44.60 bushels per acre.

Eastern.—1 plot—46—wheat—Lancaster Red—yield 167 6.8 pounds—equal to 22 17.60 bushels per acre.

Eastern.—1 plot—31—wheat—Diehl—yield 167 pounds—equal to 22 16.60 bushels per acre.

Eastern.—1 plot—53—wheat—Talavera—yield 88 4.8 pounds—equal to 11 48.60 bushels per acre.

Eastern.—1 plot—54—wheat—Rough Chaff—yield 51 4.8 pounds—equal to 6 54.60 bushels per acre.

Different Fertilizers.

Eastern.—33 plots—wheat—26 fertilizers—yield 5,864 5.8 pounds—equal to 26 23.33 bushels per acre.

Eastern.—1 plot—93—wheat—no manure—yield 139 4.8 pounds—equal to 18 36.60 bushels per acre.

Eastern.—1 plot—75—wheat—Coe—yield 209 6.8 pounds—equal to 27 58.60 bushels per acre.

Eastern.—2 plots—82, 83—wheat—Phuine—yield 428 5.8 pounds—equal to 28 34.60 bushels per acre.

Eastern.—1 plot—95—wheat—Fullmer—yield 207 6.8 pounds—equal to 27 42.60 bushels per acre.

Eastern.—1 plot—91—wheat—Pacific guano—yield 203 6.8 pounds—equal to 27 10.60 bushels per acre.

Eastern.—2 plots—78, 79—wheat—Hewes'—yield 394 6.8 pounds—equal to 26 19.60 bushels per acre.

Eastern.—2 plots—84, 85—wheat—Moro Philips—yield 397 7.8 pounds—equal to 26 31.60 bushels per acre.

Eastern.—1 plot—94—wheat—Miller & Smith—yield 197½ pounds—equal to 26 17.60 bushels per acre.

Eastern.—2 plots—80, 81—wheat—Baugh's raw bone phosphate—yield 380 pounds—equal to 25 22.60 bushels per acre.

Eastern.—2 plots—87, 88—wheat—Whann—yield 385 pounds—equal to 25 48.60 bushels per acre.

Eastern.—2 plots—68, 69—wheat—Bowers—yield 374 7.8 pounds—equal to 24 59.60 bushels per acre.

Eastern.—1 plot—62—wheat—Peruvian guano—yield 134 7.8 pounds—equal to 17 59.60 bushels per acre.

CENTRAL EXPERIMENTAL FARM, 1869.

The Assistant Superintendent of the Central Experimental Farm, reports as follows:

As to "the result of the experiment made under the programme of the series of experiments prescribed by the Board."

All the land upon which the experimental plots were in the spring of 1869 located, was then set in clover, or in clover and timothy—most of it having been mowed in the harvest of 1868. Plots from 1 to 26, and from 101 to 126, both inclusive, were farmed in exact accordance with the programme. The three several tiers of plots, from 201 to 226—from 301 to 326, and from 401 to 426, both inclusive, were allowed to remain in clover, or clover and timothy, and were all mowed, and the hay housed without any separate account of the product of each plot. As many of the plots could by no possibility, under the circumstances, have been made to correspond with the programme; and as a separate account of the product of the *grass plots*, which did correspond, would not have promoted the object in view in the establishment of the programme, this omission seemed judicious.

I am pleased to be able to report, that having exhibited one bushel of each of varieties of oats and barley, at the annual exhibition of the Pennsylvania State Agricultural Society, held at Harrisburg, I was, on the 1st day of October, 1869, awarded the *premium* for the *best bushel of Barley—Probstier.* Also the *premium* for the *best sample of newly introduced grains, valuable to farmers*, embracing *Excelsior*, *Somerset* and *Schoenen oats. Probstier* and *Saxonian barley*, produced on the plots, table No. 3; and on plots Nos. 105 and 106, table No. 1.

I also exhibited one bushel each of the same varieties at the annual exhibition of the Centre County Agricultural Society, held in Bellefonte, and was, on the 8th day of October last, awarded the *premium* for the *best bushel of oats, the Excelsior;* and also the *premium* for the *best bushel of barley, the Probstier.*

The entire product of these new and valuable varieties of oats and barley, introduced from foreign countries at great expense, and thus most successfully cultivated here, should not only be preserved for *seed*, but should be distributed directly to *agriculturists* throughout the State, instead of being allowed to pass into the hands of speculators to be retailed at enormous profits. Allow me, therefore, to suggest that fair and reasonable prices be placed, not only upon *these grains*, but also upon *the choice varieties of potatoes* on hand, and *like valuable future productions*, at which they may be sold on the farm and transmitted by express or otherwise, to agriculturists in quantities to each not exceeding one bushel.

WESTERN EXPERIMENTAL FARM, 1869.

The Superintendent of the Western Experimental farm, located near Indiana, reports as follows:

The Superintendent was appointed in March, 1869, and took charge of the same on the 1st of April following. The farm is situated in White township, Indiana county, adjoining the town of Indiana, and contains 121 acres and allowance, all cleared and under fence. A part of the farm was not in a good state of cultivation, and the buildings required enlargement and repair. Twelve acres of the upland was sown in wheat, and about eight acres very low ground in wheat and rye. There was about twelve acres in clover and fourteen acres in timothy, the balance of the land not being occupied by any growing crop.

The entrance to the buildings from the main road was inconvenient, and among the improvements was the laying out of a new road and making a new fence on each side.

About one-half of the farm is bottom ground, through which a stream of water flows. A portion of this bottom will afford a good opportunity for experimental under-drainage.

The contract made by the trustees with James P. Carter for the repair of the farm house and the erection of an addition to the same, in connection with the purchase of the farm, was prosecuted throughout the months of May and June, and finished and the house occupied on the 29th day of July.

The season of 1869 was very wet and backward, and farming operations were delayed until late in the season. All the land upon which the experimental plots were, in the spring of 1869, located, was then set in timothy. Plots from 1 to 24, and from 101 to 124, both inclusive, were farmed in exact accordance with the programme. On the 23d of April barley was sown on 21 plots. On the 24th of April plots Nos. 105 and 106 were sown in common oats, at the rate of three gallons to each plot. On the 26th of April plots Nos. 11, 16 and 116 were planted in potatoes, 2½ pecks of seed being used to the plot. On the 20th May plots from 1 to 11, from 11 to 16, and from 16 to 24, were planted in corn.

On one of the fields, on the low ground near the house, was sown eight acres of oats. One acre was sown with Eureka superphosphate of lime, at the rate of 300 pounds to the acre, which produced 57½ bushels of oats; while the balance, seven acres, produced on an average of only 23½ bushels per acre. A part of the same field was, on the 13th of May, planted in common yellow corn, the land being in poor condition. A very poor crop was realized.

The low ground on the southern end of the farm, lying along the railroad, was plowed up as soon as the weather permitted, and sown in oats between the 20th and 28th of April. This was done for the purpose of getting it set in clover and timothy. The lower part of the farm will require draining before it can be used for growing crops to advantage.

The small field adjoining the dwelling house on the north and the grounds of Indiana Agricultural Society, was plowed and subsoiled, and planted in corn, potatoes and cabbage. The area plowed in the month of April and May was over fifty acres, most of it being subsoiled.

The twelve-acre clover plot was plowed down for fallow between the 6th and 14th of July, subsoiled and heavily manured, and sown in Red Lancaster wheat on the 1st of September, at the rate of 1½ bushels per acre.

The plots numbered from 101 to 124, inclusive, were plowed, manured with compost and stable manure, 13,000 pounds to each plot, and sown in wheat about the same date, at the rate of one-fourth bushel to the plot. On the ground farmed in potatoes was sown, about the 17th day of September, one-half bushel of white French chaff Mediterranean wheat, one-half bushel white bearded wheat, one-half bushel of Weeks' white wheat, and one-half bushel winter barley.

Plots numbering from 201 to 226, inclusive, are in clover and timothy alternatively. Plots from 301 to 326, inclusive, are in clover and timothy mixed. Plots from 401 to 426, inclusive, are to be planted in corn in the spring of 1870.

The season of 1869, in this locality, was somewhat remarkable. The months of April, May and June were wet and cold, and rather unfavorable to all kinds of growing crops. About the beginning of harvest the weather became warm and dry, and during September cold, with raw winds, and closed with frost early in October. The month of November has been very unfavorable to do out door work. Before all the corn was husked a snow storm came on, which delayed our work for some days. The corn was all hauled in and husked during last month without any damage. The corn is cribbed, and the fodder carefully put away in good condition. All the implements are carefully housed; the crops threshed, and mostly marketed, and preparations made for prosecuting the work in the spring without delay.

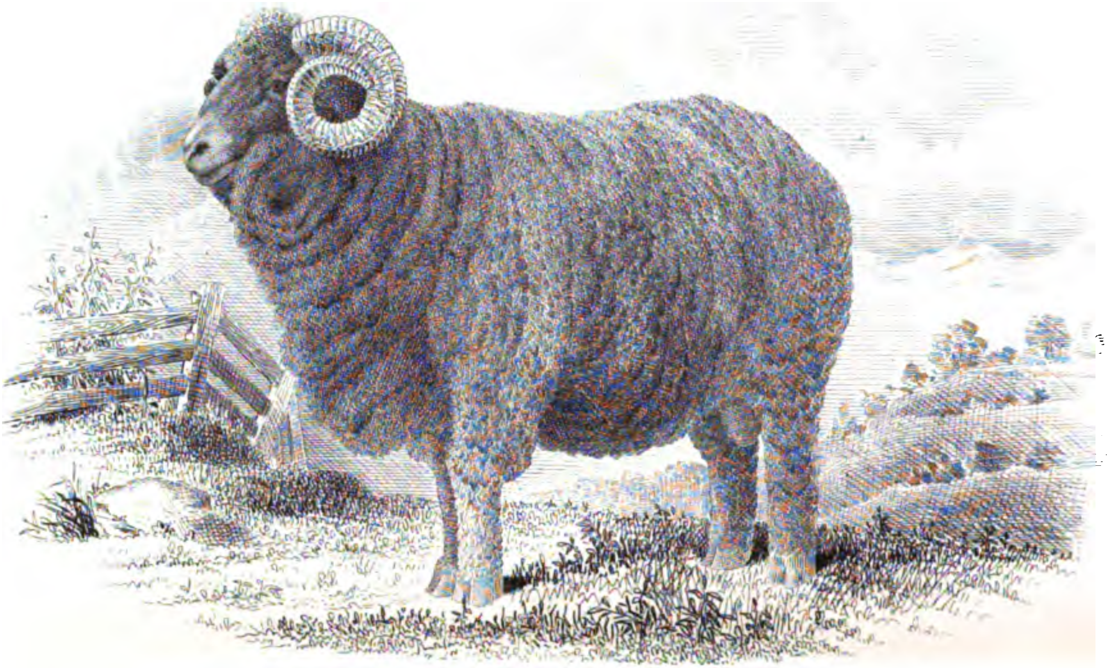
PARTICULAR STATEMENT OF THE DISBURSEMENT OF THE FARM FUND, 1869.

1868.			
Feb.	12.	Cash received of J. M. Campbell, being part of the appropriation made by the Legislature of the one-tenth part of the proceeds of the sale of the Agricultural College land script....	$17,750 00

	Amount brought forward..........	$17,750 00	
April 23.	Received balance of above appropriation..............................	26 136 50	
			$43,886 50
1868.			
Feb. 12.	Cash paid Thos. M. Harvey, purchase money of Eastern Experimental Farm	$17,750 00	
May 25.	Cash paid the Agricultural College of Pennsylvania, for Experimental Farm near college, as per deed recorded in Centre county.....................	8,000 00	
June 10.	Cash paid to Benjamin J. Passmore, for writing deed for Eastern Experimental Farm.....................	10 00	
Dec. 10.	Cash paid Dillwyn Parker, Esq., for recording deed of Eastern Experimental Farm, in Chester county....	2 45	
" 10.	Paid James P. Carter, on account of the purchase money of the Western Experimental Farm...............	5,000 00	
1869.			
Feb. 10.	Paid James P. Carter, on account of the purchase money of Western Experimental Farm..................	8,000 00	
March 6.	Paid Recorder Gephart, for recording deed of the Experimental Farm, Centre county.....................	2 50	
" 12.	Paid for stamps on same deed........	8 00	
May 1.	Paid James P. Carter, on account of purchase money of Western Experimental Farm.....................	3,000 00	
June 7.	Paid James P. Carter, on same account,	1,000 00	
Aug. 10.	Paid James P. Carter, balance of purchase money due on Western Experimental Farm.................	1,113 55	
			43,886 50

MOSES THOMPSON, *Treasurer.*

AGRICULTURAL COLLEGE, *January*, 1870.



THOROUGH BRED VERMONT MERINO RAM

owned by [illegible] BIGHAM [illegible]

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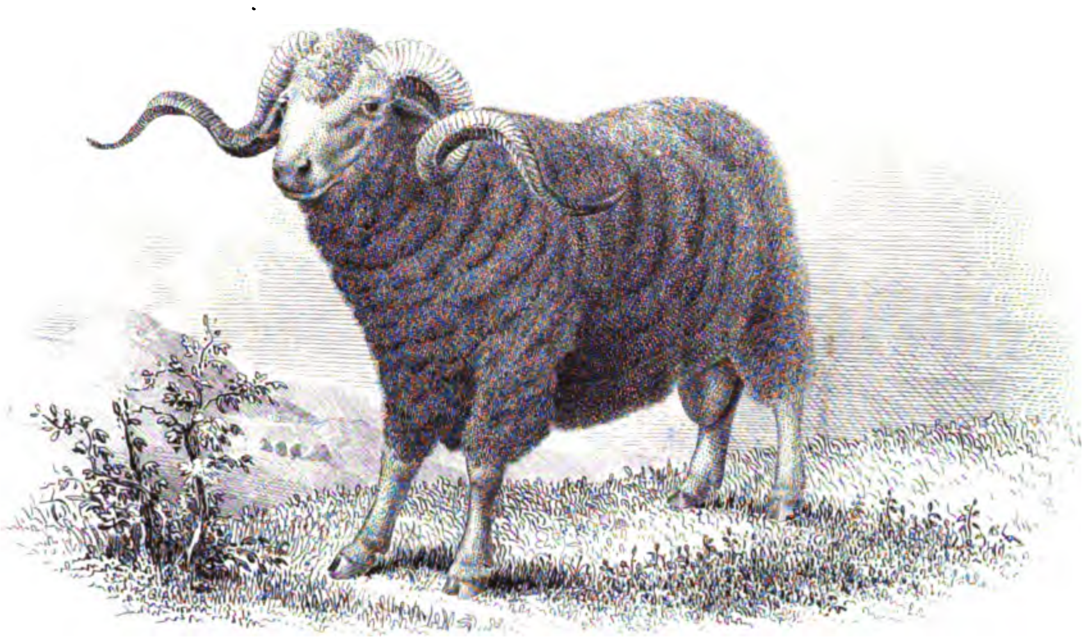

THOROUGH BRED "LIGHT TOP" MERINO RAM
"CAPTAIN"
Owned by JOSEPH KIRKPATRICK, North Liberty, Mercer Co, Pa

[illegible]

REPORT OF 1870.

The reports herewith, from Thomas H. Burrowes, LL. D., the President of the Agricultural College of Pennsylvania, showing the condition of its educational department; from the same officer, as Professor of Agriculture, relative to the progress of the experiments upon the model farms connected with the institution; from the superintendents of the farms in Chester, Centre and Indiana counties, with tabulated results of the same, set forth so completely the condition of the corporation that detailed remarks from the Board of Trustees appear to be unnecessary. A reference to, and comparison with, the report of 1869, will show the progress made in organizing and conducting the farms. The catalogue contains all the information relative to the educational department, the receipts from which source show a gradual and cheering increase, having risen from $3,699 in 1869, to $6,510 in 1870, and are still increasing. As the three farms are now conducted upon exactly similar forms, we hope that our next report will show that the experiments have conduced to the enlargement of agricultural knowledge, and that the educational department has been more efficiently and successfully managed than ever before.

The treasurer's report shows that the receipts from all sources have been $33,943 03; the expenses, $33,378 08; leaving a balance in the treasury at the close of the fiscal year, September 1, 1870, of $564 95.

All of which is most respectfully submitted by the Board.

F. WATTS, *President.*

AGRICULTURAL COLLEGE, *December* 21, 1870.

BOARD OF TRUSTEES, 1871.

His Excellency, John W. Geary, *Governor of Pennsylvania, Harrisburg, Pa.*
Hon. F. Jordan, *Secretary of the Commonwealth, Harrisburg, Pa.*
James Calder, D. D., *President College Faculty, Agricultural College, Pa.*

Hon. A. O Hiester, Harrisburg, Dauphin county, 1871; James Kelly, Esq., Wilkins, Allegheny county, 1871; B. Morris Ellis, Esq., Hughesville, Lycoming county, 1871; Hon. Frederick Watts, Carlisle, Cumberland county, 1872; Gen. Harry White, Indiana, Indiana county, 1872; Joseph C. Turner, Esq., Chadd's Ford, Chester county, 1872; Daniel Kane, Esq., Uniontown, Fayette county, 1873; H. N. M'Allister, Esq., Bellefonte, Centre county, 1873; A. Boyd Hamilton, Esq., Harrisburg, Dauphin county, 1873.

President—Hon. Frederick Watts.

Treasurer—Moses Thompson, Esq.

*Secretary of the Board—James Calder, D. D.

THE COLLEGE PROPERTY consists of a tract of 400 acres, of which 100 have been set off as a Model and Experimental farm, and worked separately from the main college farm of 300 acres, though under the supervision of the President as Professor of Agriculture. The tract is in Harris township, Centre county, about 12 miles west of Bellefonte, and nearly equidistant from the opposite extremes of the State. It is near the middle, from north to south, of the broad rolling valley formed by the junction of Penn and Nittany valleys, which unite at the end of Nittany mountain, about 3 miles east of the College, with Tussey mountain on the south, and Muncy mountain on the north. The landscape is broad, varied and beautiful, the climate healthful, and the surrounding population intelligent, industrious and moral. The sale of intoxicating drinks within three miles of the college is probibited by law.

THE COLLEGE FARM is now worked in five divisions or fields, of from 40 to 50 acres each, so as to ensure a regular succession of crops ; the remainder of the tract being occupied by the college grounds, garden, orchard, and two pieces of woodland. The surface is moderately rolling, without any broken land or swamps; the soil is limestone with a large admixture of flint, and admirably adapted to the production of wheat, Indian corn, oats, barley, and the various kinds of grasses. It responds freely to the use of lime, of which large dressings are now applied, and of plaster of Paris and the various artificial fertilizers. All the bread and vegetables and most of the meat consumed by the students and employees are produced on the place, and its productiveness is increasing. Hereafter the cattle, during summer, will be fed or soiled on green forage in proper yards, and root crops raised for winter food, to increase the quantity both of stock that may be kept, and of barnyard manure. The stock now consists of mules for labor; a Durham bull and several grade and native cows,—the purpose being to introduce the pure Durham blood as soon as practicable; and of several breeding swine of the Chester county breed, with a sufficient stock for house use.

THE FARM BUILDINGS are a large well arranged overshot barn, with double threshing floor, threshing house, corn cribs and root house attached, and stabling for mules and other stock below, an extensive hog pen, tool house, and plow house. A wash house and slaughter house are also on the premises and conveniently placed, with roomy and well equipped carpenter and blacksmith shops.

THE GARDEN contains about six acres of prime land, and having all been sub-soiled or trenched and well limed and manured, is now highly produc-

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* These reports were made to the Board before the decease of Dr. Burrowes.

tive. It has a stock of small fruit, such as currants, gooseberries, &c., and strawberries in profusion.

The apple orchard of twelve acres is just coming into good bearing. Cherries are in great variety and abundance.

THE EXPERIMENTAL FARM is one of three farms, the others being in Chester and Indiana counties, directed by law to be established and conducted as Model Farms, equipped with the most convenient kind of buildings and apparatus, and farmed in the best manner by hired labor, to serve as examples in successful practical agriculture; and also as Experimental Farms, to test by experiments in sufficient series, and to decide by results, those numerous doubtful questions, as to modes of culture, relative value of manures, kinds of seeds, succession of crops, qualities of live stock, &c., which perplex the farmer; and to make known the results, when sufficiently verified, to the public. The greater portion of each tract is devoted to the general Model Farm, and the remainder to the trial of experiments.

TERMS.—To benefit the student and suit the operations of the farm, the year is divided into two terms:

THE SPRING TERM of 24 weeks, beginning on the second Monday in February, and ending on the last Friday in July.

THE FALL TERM of 16 weeks, beginning on the last Monday in August, and ending on the third Friday in December.

VACATION.—The summer vacation is four weeks, and the winter eight; students being expected to report at the College on the Friday next before the beginning of each term. Entrance on the first day of the term will greatly benefit the student.

THE CHARGE to boarders is $100 for the Spring, and $70 for the Fall term, which is in full for tuition, boarding, washing and fuel, with $5 a year for room rent, and a deposit of $5 to meet damages, if any. Each student is to provide his own furniture, light, books and stationery; but the heavier articles of furniture can be had from the College for a moderate rent, if desired.

All College charges are payable in advance, at the beginning of the respective terms.

INDUSTRIAL DEPARTMENT.—In this branch of its operations, the college has been remarkably successful. When re-opened, two years ago, some difficulty was encountered in combining labor with study and inducing the students to work willingly. This was chiefly owing to the wrong footing—as an inferiority—upon which labor had been previously placed in the course of college exercises, and to the counteracting influence of the half dozen students under the old regime, who remained in the institution at its reorganization. But soon better counsels began to prevail, and every term since has shown, more and more, the possibility of making the desired combination successful and useful, both to the student and the college, till now, speaking from considerable experience in the employment and management of farm hands, the undersigned feels safe in saying that he has never had more or better work done, in the same time, than by the students of the Agricultural College during the term just closed. The secret of success is found in the facts that their labors have been shared by their instructors and intelligently explained, and not driven by task-masters, and that the larger proportion of the students are farmers' sons, intended for and desirous of improvement in their proper profession. Actuated by this spirit, the statement need not excite surprise, that during the two years of the trial of the plan in operation, not a single instance has become known of the wilful breakage of an agricultural implement, or of cruelty to the working animals on the farm.

With a working force never exceeding eight lads in labor detail at once, and the working time only eight hours each day for five days in the week, and with a draught force of only nine light mules, the arable portion of the farm, 250 acres, including the garden, has been, during the portion of the year embraced in this report, as well, promptly and productively cultivated as any farm in the State. A larger force would, of course, have added to its productiveness, by enabling that careful and hand labor to be applied which so much tells in crops. One hundred students on the roll will allow this to be done; and with a full college of four hundred, the place can be worked like a garden and made as beautiful as a show park.

The statement of the farm work accomplished from January till September, 1870, is as follows:

4,715 bushels of slaked lime hauled three-fourths of a mile and spread.
127 acres plowed for corn, oats, barley, potatoes, wheat, &c.
250 acres harrowed once for oats and barley.
80 acres rolled for grass, oats and spring grain.
1,900 cart loads of stones hauled off of fields.
103 acres of wheat, oats and barley cut and housed.
90 acres of hay cut and housed.
250 four-horse loads of manure hauled out of yard.

This was all ordinary annual work of the farm; and though the general teamster assisted, when not on the road hauling coal, &c., from Bellefonte, nearly all of it was done by the students, to which are also to be added threshing the previous year's heavy crop, cultivating the corn, raising the potatoes, working the garden, &c.

The following permanent improvements were also made:

The barn-yard, of one-quarter of an acre, was graded up on two of its sides, an average of four feet, with stones covered with clay, so as to cause a fall from each of the four sides to the centre, for the retention of the manure water.

The fence on the same two sides was raised up four feet, and 250 feet of shedding, as a shade for cattle in summer and shelter in winter, and as a platform for corn fodder, were put up.

A double corn-crib, 45 by 21 feet, with a heavy roof, was moved 180 feet to the rear of the barn and elevated 12 feet, and substantial piers of stone placed under it.

A properly graded road was made from the turnpike to the college gate, 20 feet wide and 420 long, covered with broken stone one foot thick, and topped with brick-dust from the old brick-kilns.

The whole actual cost of these improvements, to the Board, was $130 for lumber, mason work and nails; the other work having been done by the students, under direction of the efficient master mechanic.

Much work was also done in the carpenter and blacksmith shop, including repairs and horse-shoeing, the making of several new farm implements, and all the glazing and lock mending. By assisting in these employments many valuable lessons in mechanics and farm management were acquired.

The light, but regular, exercise of these labors, has had an excellent effect upon the health, growth and physical development of the students. All left at the end of the term in good health and spirits, and in greater vigor of body and mind to encounter the trials of life than when they entered. No death occurred, and there were few cases of indisposition, except those arising from slight hurts at work or play—base ball and foot ball having received a due share of attention at leisure hours.

Four of the students, whose homes are at a distance from the college, remained on wages, to assist in the farm work during the summer vacation. These not only gave entire satisfaction, but prevented the unpleasant necessity of introducing ordinary hired laborers.

During haymaking (120 tons were housed) and harvest, a number of the students worked over-hours, at 10, 12 or 15 cents per hour, according to ability, and thus enabled a heavy crop of hay and grain to be secured in good time and condition.

GENERAL REPORT UPON THE EXPERIMENTAL FARMS.

The Professor of Agriculture respectfully reports: That though charged with the general supervision and management of the three Experimental farms of the State, his duties as President of the College have been such, during the period of resuscitation through which the institution is now passing, as to engage nearly all his attention, and leave, for the present, barely time to issue general instructions to the farms, to receive their annual reports and prepare his own for the Board. This department of his work—so far as relates to the general tabularizing of results, which is the most important as well as laborious portion, would either be very imperfectly or not at all performed were it not for the zeal, ability and self-sacrificing labor of H. N. M'Allister, Esq., chairman of the local committee of the Central farm, to whom the success so rapidly crowning this portion of the Board's trust is mainly due.

Any one who shall carefully examine the General Tables drawn from the reports now presented, and who is capable of appreciating the value of the reliable contrasted results thus arrived at, and the amount of labor necessary to synopsize them, will admit the importance to the intelligent farmer of this onerous but gratuitous task.

In this connection it is proper to say, that while the superintendents of the Western and Central farms have made their reports and tables mainly in the form prescribed, that of the Eastern still not only adds a great deal of matter not embraced in the programme enjoined upon all, but departs from the instructions as to the manner of reporting. This imposes very considerable additional labor in the general tabularizing and contrasting of the results, and unnecessarily increases the number of pages to be printed. Last year, owing to the fact that the Eastern farm had been put into operation one year before the others, and under the supervision and control of several societies and clubs in that part of the State, it was found that the form and manner of proceeding and reporting must be in several respects different from those enjoined by the central authority. This reason for the departure, then assigned, was, for that occasion, admitted as sufficient; but the expectation was expressed that thereafter strict compliance with instructions would take place. This expectation has not been realized.

As to the extraneous matter in the report—beyond the programme adopted for all the farms—the undersigned makes no special objection. It is true that little reliance is to be placed upon mere occasional or annual experiments, in comparison with the infallible test afforded by a long series of years of the same experiments, eliminating, as frequent repetition does, from the general result all the influence of variety of season, differences in harvesting and other accidents, and affording perfectly reliable conditions for the conclusions arrived at. Nor is objection made to trials of fruit culture, &c., either for profit or instruction. These may be very interesting and useful in particular vicinities; and so long as the farming community of the region is willing and liberal enough to contribute for their support, there is no good reason why they should not be made and reported. All that is just now contended for is, that the prescribed experiments in agriculture proper, enjoined by this Board and intended to be similar and similarly conducted on each of the three farms, shall not only be made, but reported in strict accordance with instructions—the remainder of each tract being left to the direction and control of the local committee and the intelligence of the proper superintendent, for the local and extra-programme experiments.

These special remarks suggest the general and very important question, what is the primary sphere of action of an experimental farm? For, until this is clearly understood and substantially acted upon, the whole attempt will remain in a state of uncertainty, and the noble enterprise may be positively broken down by undertaking too much and doing nothing thoroughly.

Very soon after assuming his present position, and becoming acquainted with its duties and with the objects of such farms, in their widest sense, it became apparent to the undersigned that those objects were three-fold, though of very dissimilar importance in themselves, and that there was danger that the attempt would be made to cover the whole ground, without regard to the question as to what was primary and essential and what was only secondary. These three classes of objects are well specified in the report of the Central Farm, as—1. Experiments upon rotation of crops and modes of culture; 2. Upon the relative merits of fertilizers; and 3. Upon different varieties of grains, seeds and vegetables.

Properly conducted and sufficiently protracted and repeated experiments upon the subject matter of each of these classes would, no doubt, prove of great benefit to the farming community, and much promote the general prosperity of a State like ours. Yet it cannot be conceded that, though all are desirable, all of them are not of equal interest or value to the public. Therefore, in classifying them according to their value and present urgency, the undersigned has no hesitation in placing that which relates to rotation of crops and modes of culture at the head of the list, and far beyond the others in urgency and value.

The reasons for this preference are so obvious as scarcely to need statement. Yet it may be said that the proper rotation of crops and the best modes of culture are points independent of and above all questions of the relative merits of fertilizers and of the various kinds of seeds and plants; for, no matter how superior a manure may be, or desirable a new seed or plant, neither will be of much avail to the farmer unless properly prepared for and applied to the ground, and planted in proper order; while inferior seed, with good labor and common manure, is likely to afford a good yield. Of course, in the term of crop rotation is understood to be embraced that succession, avoiding exhausting repetition of the same crop, as is based upon a knowledge of the plant and the draft it makes upon the soil; and in proper modes of culture are comprised the questions of deep and shallow plowing, time of sowing and harvesting, quantity of seed to the acre, depth of covering on seed, the time and manner of applying barn-yard manure, lime, plaster of Paris, compost, and the other non-artificial fertilizers, with the scores of other questions in tillage and husbandry, both as to plants and animals, which challenge the farmer's attention, before and above all discussions of mere artificial stimulants and new seeds. And it may here be added that the direction of the operations of the Experimental farms mainly to experiments of the first class seems to have been the original purpose of the Board, if a conclusion may be drawn from its published programme of experiments, and that the inclusion of so many fertilizers, and of the acclimation of new seeds and plants, has only been of recent introduction into the plan.

Now, though the value of tests of the second and third classes is also freely admitted—though much inferior to those of the first—yet it is very seriously questioned whether it is good policy very largely to burthen the yet new and comparatively unpopular enterprise of the Experimental farms, with a system of operations so complicated, and so constantly increasing in its ramifications and details, as they will have to labor under, should the charge of and responsibility for all the trade fertilizers of the land be thrown upon them; and should to this be added the duty of trying and endeavoring to accustom to our climate every new seed and plant which the convenience of the Agricultural Department at Washington may assign to us.

As to fertilizers, as they are in many cases so improperly called—being in reality, generally, but temporary stimulants, with little, if any, power permanently to enrich the soil—their comparative value is not so much a question of practical agriculture as of chemical test and analysis, for, their ingredients and proportions being known, and the nature of the soil for their application ascertained, their effect thereon can be foretold with as much certainty as that of a cathartic or a stimulant upon the human body. This known, the only question remaining is whether the manufacturer has honestly incorporated ingredients of the proper kind and in the proper proportions in his mixture. That this is not always done is a matter of very general complaint, and in the minds of some it forms a reason why the scientific agricultural authorities of the State should take charge of this matter, and after full test, announce to the public which are and which are not pure and effective. Of course this would be a great object gained were there any probability that an award of purity from the public authority would always ensure the issue of none but the pure article, by the approved manufacturer. But it is not in human nature that this shall be the result; and any one who watches the operations of this trade will be apt to conclude that in many, if not in most cases, awards of this kind prove but helps to the sale of adulterations. In this connection it may be added that even the practice of our own farms, under resolution of this Board, to accept donations of artificial fertilizers for test on the farm, but at the same time to purchase, in the open market, an equal quantity of that offered to the public of similar kind with the donated, and test both under similar circumstances, before making any announcement of the effects or value of the donation, affords little guard against fraud. And thus affording no permanent protection, this practice probably will, before long, subject the farms to much expense; for, whether needed or not, the donation of a certain quantity of any fertilizer imposes upon the recipient the expense of purchasing and applying as much as is given in each case, though neither desirable nor needed.

As to new seeds and plants, their productive adaption to our soil and climate, though very desirable, is, in most cases, but a question of time. There is neither science or skill involved in the operation. All that is needed is patience and a sufficient repetition of the sowing or planting, if the seed or plant be within range of our climate, till acclimation and full productiveness be effected. Why this operation, which is so simple and within the power of every farmer, should be imposed amongst the primary duties of a public experimental farm, is not very evident. It may be true that the trial of new fertilizers and of new seeds ought, to a moderate extent, be included in the operations of farms of this class; but it is equally true that the utmost care should be exercised to keep in sight the main object, as of more importance than any others.

Hence the undersigned inclines strongly to the opinion that it is to modes of farming that these experimental farms should be chiefly devoted; and that the choice of competing articles, be they artificial stimulants or new seeds for the soil, should be left, as it may safely be, to private choice and enterprise. This view derives additional force from the self-evident fact that if the energies and means of the farms be mainly confined to experiments of the first class above named, the number, certainty and completeness of those experiments will thereby be proportionately increased, and those general processes which are common to all fertilizers and all seeds be to the same extent rendered more reliable and satisfactory.

It is to be understood, however, that while the number of trials of fertilizers may, and ought to be, much limited in the list of programme experiments, yet that the local authorities of the farm should have full discretionary power in shaping and adapting this class of experiments, beyond the programme, to the wants of the varying soils and climate, and to business connections of the respective sections.

After these general remarks, which a sense of duty to this great and promising enterprise seemed to demand, the attention of the Board is invited to the reports, herewith submitted, from the three farms, and also to the synopsis or tabularized results of the series of experiments, thus far, under the general programme. Those beyond the programme are also deserving of examination, though neither time nor space, here, permit any more express allusion to them.

Some of the contrasted results of the experiments under the programme as now reported, are interesting as well as remarkable, and it is difficult to resist the temptation to specify them. However, the intelligent farmer will not only examine the whole tables for himself, but concur in opinion that it would be premature to draw much attention to results which further experiments may fail to verify or sanction.

The financial portions of the respective reports also claim examination. All the farms seem to have been well managed, and their affairs to be in a good condition. The Eastern farm, being now engaged in some building and other improvements, of course the expenditure for labor and boarding are greater than on the others. While in the Central and Western farms, little outlay of this kind having been incurred during the year, their expenditures are found to be about an average of what may be expected in the future, should the details of their operations be not greatly extended. The amount of expense is about the same in both cases, and, judging from the reports, the whole three farms appear to have been economically managed.

The letters of instruction under which the farms are now conducted, their operations recorded, and the annual reports to be made under these schedules, are hereto also annexed, not only for general information, but that they may be constantly accessible by the managers of the farms for future guidance.

THO. H. BURROWES,
Professor of Agriculture.

EASTERN, CENTRAL AND WESTERN EXPERIMENTAL FARMS.

To the Farm Superintendents:

The product of every plot must be carefully weighed and entered, in pounds and fractions of a pound, under the appropriate heads, thus—1869, corn, 300 pounds, the fractions to be entered in ounces—that is, the sixteenth of a pound—to the right and above the pound, thus—1869, barley, 251^3 pounds. Until otherwise ordered, the weights of the barley, oats and wheat in the straw, clover, timothy, and clover and timothy, to be taken on the hay scales as the same shall be removed from the harvest-field to the barn. The weight of the corn to be taken in the ear as the same shall be removed from the plots to the crib, and the weight of the barley, oats and wheat to be taken as the products of the plots shall be threshed and cleaned respectively. The five tiers of plots, numbered from 1 to 30, from 101 to 130, from 201 to 230, from 301 to 330, and from 401 to 430, respectively, are the only plots contained in the published programme of the series of experiments. The sixth tier of plots, from 501 to 530, &c., is added, and blanks left for the insertion of appropriate headings, with a view to record upon the same pages the results of other experiments than those embraced in the published programme. The residue of the six several tiers of plots, as represented on pages 4, 5, 6, 7, 8 and 9, are designed for the record of experiments as the number of the plots in the said several tiers shall, from time to time, be extended. Every *page*, from *one* to *nine*, inclusive, contains spaces for recording the product of *forty plots for ten years*, and also spaces for recapitulating and noting the *combined diversities* in every tier of plots between those plowed with an ordinary plow and those plowed with the subsoil and Michigan plows.

Pages 10 and 11 are designed for posting and bringing into proximity the combined diversities in the six several tiers every year during the ten years represented upon all the preceding pages. Pages from 12 to 22 are designed for another *decade*, to commence in the year 1879 and end in the year 1889, both inclusive. This book contains, therefore, ample room for recording the products, not only of the 150 plots upon the published programme, but the entire productions of 432 plots for a *term of twenty years*, together with sufficient table spaces upon which to combine, compare and contrast the results of the different experiments. All results to be reported by the principal assistant to the Professor of Agriculture at the College, as soon after the ascertainment thereof as possible, and as nearly as may be, thus: Corn in ear—No. 1, 300 pounds; No. 2, 287^2 pounds; No. 3, 248^3 pounds, &c. Barley in straw, No. 101, 250 pounds; No. 102, 251^2 pounds, &c. Potatoes, No. 11, ¼ large, 200 pounds; ¼ medium size, 180^2 pounds; ¼ small, 175^3 pounds; ¼ cut, 181^2 pounds; No. 16, ½ large, 210 pounds; ½ cut, 208^2 pounds, &c.

THO. H. BURROWES,
President Agricultural College and Professor of Agriculture.

Agricultural College, May 29, 1869.

To the Farm Superintendents:

Gentlemen: In order to a distinct understanding of our relative duties under the Board of Trustees of this institution, whose agents we are, I will here state the authority under which we act, and then give such explanation and instruction as may prevent misapprehension and tend to harmony in our several offices.

Three farms were established by virtue of an act of Assembly, passed on the 19th of February, 1869; their local management is regulated by resolutions of this Board, adopted, or rather modified and explained, on the 17th of November, 1869; and the mode of reporting their operations is prescribed by resolutions of the same Board, adopted on the 4th of September, 1869, of which resolutions you have heretofore been furnished with copies.

1. As to the act of Assembly on the subject, it seems plain, and this Board have taken that view of the matter, that the purpose of the Legislature was as well to establish model farms at each of three several points in the State, as widely apart from each other and as different in soil and climate as possible, for the exhibition of the best modes and processes of farming prevailing in their respective regions, and for examples of the perfection and productiveness of agriculture therein, as to have certain experiments tried upon each of them, in the same manner, with the same crops, under the same culture, and for a sufficient series of years, in order to settle certain doubtful questions as to modes of plowing, kinds and quantities of manures, qualities and quantities of seed, time of harvesting, &c., &c., so as not only to ascertain which are best, but to determine and note the effects of soil and climate in the different cases. To accomplish both these purposes, this Board has for the present set apart about three-fourths of each farm for general cultivation, and committed it to the management and control of the local committees and authorities, for model purposes, and also for such local experiments as they may deem expedient; while it has retained the residue within its own entire control and management, through your agency and under my directions, for those comparative experimental purposes just described, under the general head of the two objects of these farms. I have now nothing further to remark, except that the distinction just specified is to be always kept in view, not only for the purpose of effecting the intention of the Board, but of avoiding those conflicts of authority which are so apt to breed ill feeling and retard the objects we all have in view in the premises.

2. In regard to the controlling authorities of the farms, it is to be remembered that, while it is out of the power of this Board entirely to strip itself of its ultimate control or responsibility in relation to them, it is equally within its desire to confer all necessary authority for their proper management as model farms upon the local committees and their own proper officers, subject to the supervision of, and report to the Professor of Agriculture. And it certainly is neither his wish nor design to limit them in a just and full discretion in this matter. You will perceive by reading the resolutions on this point that only in the matters of expenditure and appointment has the Board placed any express restrictions upon the local committees. As to appointments, I need not tell you that there has been no disposition by the Board or myself to control the committees, they being responsible for the good management of the several farms, though I have

the selection of the agents; and you, so long as faithful and successful, will have the confidence of the Board and its officer here. And in regard to expenditure, its only care here is that it will be kept within means and that no embarrassing debt be incurred; but if from the liberality of your several vicinities, or from any other source, additional means for rendering the farms efficient and improving their buildings, stock and apparatus be procured, it will afford the Board much gratification and pleasure to hear of such acts of public spirit and of their application to the general improvement of agriculture.

3. The general nature of the annual report is described in the resolutions of the Board. It is to be in the hands of the Professor of Agriculture not later than the first of December each year, so as to enable him to tabularize such portions as pertain to the programme of the experimental plots—a copy of which you have—and also to digest the rest of it, with any additional experiments you may have made during the year, for his own general report to the Board, which is to be made to that body early in the month of January following.

In the portion of your reports relating to the farm generally, you will embrace only those items which are of annual occurrence, such as quantity and value of each crop, average yield of grain and grass to the acre, total of income and expenditure—designating under the latter head the amount for labor, for implements, for increase of stock and for buildings, if any—also, of any donations of stock or implements as may have been made in the year; you will please give the particulars. The object of this portion of the report being not only to exhibit the operations for the preceding year, but to enable the Board and the public to contrast the relative successfulness of the management of all the farms with each other.

In regard to the report on the experimental plots, I need only refer you to the report for 1869 of the Central farm, which, having been drawn up with great care, and under the immediate eye of the local committee, was intended to serve as an example for future reports. You will, therefore, be safe in following its form as to tables, weighing, measuring, &c.

Some of the tables and lists in the reports of last year need not be repeated in those for the present or future years, such as lists of donations of implements, stock, money, &c.; but if any additions have been made to these lists during the year you will specially report them.

In making report of any extra experiments not in the programme, either on the main or experimental portion of the farms, you will be as exact as possible, giving not only all particulars as to modes of culture, quantity and kind of manure, and of seed, time of planting, manner of treatment during growth, if any required, and time of harvesting, but also describing the kind of soil, previous condition of ground and former applications of manures, &c. Occasional experiments are not so reliable as tests and guides as those persisted in for a course of years, yet they are often very interesting and in some cases instructive, but even then their value mainly depends on the fullness and accuracy with which all their conditions are known and recorded.

I need not urge upon you strict regard to the directions of the Board in relation to the portion of your farms devoted to the series of experiments enjoined by the adopted programme; all that is required in that relation being compliance with the programme itself and the extensions thereof hereinafter directed. This being attended to, and the results faithfully reported, the Board will be satisfied with and meet the responsibility of this portion of your operations. But I would urge the greatest attention and effort toward making the large remainder of the land committed to your care a model indeed of good farming in your vicinity. The public, knowing that not only $2,000 a year, but the whole produce of a good sized farm, in fine order, and with a full force of hands, are devoted, not to making money for the support of a family or paying off debt, as is done and successfully done by so many farmers, but solely to the exhibition of good farming and the largest productiveness, will naturally and may justly hold us all answerable for something creditable as well as useful in the results of the system.

In addition to these general explanations and instructions, and in view of the fact that only certain tiers of the plots of the programme have yet been brought into cultivation, and that the tiers are all about being extended, it becomes indispensable to give some further and more specific instructions to regulate and effect improvements in such extensions, as follows, to wit:

The sixth tier of plots, commencing with 501, established to test the merits of new varieties of grain, seeds and vegetables, being *now* upon the Central Farm in wheat and rye from plot No. 1 to No. 9, inclusive, you will commence the spring crop in *the range* of the present year, (1870,) appropriating the plots as far as you have secured or can secure seed, as follows, to wit:

Plot No. 510 to Excelsior oats.
Do..511 to White Poland oats.
Do..512 to White Schœnen oats.
Do..513 to Somerset oats.
Do..514 to Surprise oats.
Do..515 to White Swedish oats.
Do..516 to Prince Edward oats.
Do..517 to Belgian oats.
Do..518 to Black Tartary oats.

Plot No. 519 to Black Swedish oats.
Do..520 to Black Poland oats.
Do..521 to Black Norway oats.
Do..522 to Black Hungarian oats.
Do..523 to Probstier barley.
Do..524 to Saxonian barley.
Do..525 to Common four-rowed barley.
Do..526 to Long eared Rottingham barley.
Do..527 to Golden Melon Seed barley.
Do..528 to Chevalier barley.
Do..529 to Brewers' Delight barley.

If you have not already received, you will shortly receive, by rail, commercial fertilizers from the manufacturers whose names are mentioned below, which, with barn-yard manure, you will apply at your discretion, in quantities equivalent in commercial value, to the ranges of the five tiers of plots, so far as you have or can establish them, commencing with 27, 127, 227, 327 and 427, respectively, as follows, to wit:

Corn and Oats rotation.

To Nos. 27, 127, 227, 327 and 427, Ter Hœven's horn dust.
To Nos. 28, 128, 228, 328 and 428, no manure.
To Nos. 29, 129, 229, 329 and 429, Miller & Smith's superphosphate of lime.
To Nos. 30, 130, 230, 330 and 430, barn-yard manure.
To Nos. 31, 131, 231, 331 and 431, Miller & Smith's ground bone.
To Nos. 32, 132, 232, 332 and 432, Lister Brothers' ground bone.
To Nos. 33, 133, 233, 333 and 433, Lister Brothers' bone meal.
To Nos. 34, 134, 234, 334 and 434, Lister Brothers' bone flour.
To Nos. 35, 135, 235, 335 and 435, Harrisburg Fertilizer Company's superphosphate of lime.
To Nos. 36, 136, 236, 336 and 436, Harrisburg Fertilizer Company's animal compost.
To Nos. 37, 137, 237, 337 and 437, Harrisburg Fertilizer Company's pure ground bone.
To Nos. 38, 138, 238, 338 and 438, Breinig & Helfrich's complete bone manure.
To Nos. 39, 139, 239, 339 and 439, Watson & Clark's superphosphate.
To Nos. 40, 140, 240, 340 and 440, South Carolina bone deposit.

Potatoes, instead of Corn, in the rotation.

To Nos. 41, 141, 241, 341 and 441—¼ Ter Hœven's horn dust.
¼ no manure.

To Nos. 41, 141, 241, 341 and 441—¼ Miller & Smith's superphosphate of lime.
¼ barn-yard manure.

To Nos. 42, 142, 242, 342 and 442—¼ Miller & Smith's ground bone.
¼ Lister Brothers' ground bone.
¼ Lister Brothers' bone meal.
¼ Lister Brothers' bone flour.

To Nos. 43, 143, 243, 343 and 443—¼ Harrisburg Fertilizer Company's superphosphate of lime.
¼ Harrisburg Fertilizer Company's animal compost.
¼ Harrisb'rg Fertilizer Company's pure ground bone.
¼ Breinig & Helfrich's complete bone manure.

To Nos. 44, 144, 244, 344 and 444—¼ Watson & Clark's superphosphate.
¼ South Carolina bone deposit.

You will apply these fertilizers, and *no others*, to those plots throughout the whole five years rotation of crops, taking special care to use but one, and that an approved variety of oats, in the first tier; but one, and those approved varieties of corn and potatoes, in the fifth tier, and the same, and those well known and approved varieties of wheat, grass, &c., as they shall come in rotation. Your careful attention is directed to the enlarged programme forwarded you upon which, so far as has not already been done, you will make the above impress. In testing the relative merits of the commercial manures you will purchase, if possible, in the market, and the more indirectly the better, provided you secure perfect reliability, the same denominations of the fertilizers of the respective manufacturers as those donated, and use the purchased article side by side with the donated article, appropriating one portion of each plot to that donated, and the other portion to that purchased. You can use the donated fertilizers upon any part of the farm to an *amount equal* to that purchased. The manufacturer is required to furnish, free of charge, sufficient fertilizers to manure the range or ranges of plots appropriated to his fertilizers, across the five tiers upon each farm, during the five years series of crops. Should more be donated by any manufacturer than that required for present use on the range of plots, it may be used elsewhere on the farm, with the distinct understanding (an account being taken thereof) that a like quantity and quality shall be supplied by purchase, from the same manufactory, as shall be required for use in the range of plots so appropriated as aforesaid.

To test the relative merits of the best of the different varieties of the potato you will appropriate as follows:

Plot No. 530—½ to Early Rose; ½ to Early Goodrich.
Do..531—½ to Climax; ½ to common Mercer.
Do..532—½ to Harrison; ½ to Cuzco.
Do..533—½ to White Peach Blow; ½ to Garnet Chili.

The succession of crops in the extension of the programme, except when specifically stated upon the face thereof, is left for consultation, and will be the subject of future instructions.

It will be best, in the absence of designation, to keep the plots in clover, timothy or other grasses, as in that condition they can be appropriated to almost any crop.

THO. H. BURROWES,
Professor of Agriculture.

EASTERN EXPERIMENTAL FARM.

I herewith hand a statement of our doings the past year at this farm. It may be proper first to remark, that this farm was put in operation one year before the other two, and without any advice or direction from the trustees of the college as to what was to be done, how performed, or with what means.

By the liberality of neighbors in the vicinity of the farm and a few others, a limited amount of money was raised and a very imperfect equipment procured. Delegates from the farmers' clubs and agricultural societies in the eastern part of the State made out a programme for our guide, embracing most of the important principles in agriculture and its associated arts of fruit and vegetable growing, stock raising and feeding, dairying, &c. When the programme came from the college authorities, a year after, it made confusion, as we could not manage both in full. We know the college authorities should be obeyed in full; and at the same time respect should be shown to the intelligent farmers who contributed the means to stock and equip the farm.

This farm is rolling, and it would be impossible to get land enough together, of uniform quality, to lay out all the plots prescribed of full size. The land best adapted to the purpose was in wheat last year; and the adjoining peach orchard will, ere long, have to be removed, which will make other land suitable for the purpose. We have now many plots laid out and in use, as near the programme as possible, but they are in different parts of the farm and not very satisfactory.

In relation to the crop experiments, we have to remark that the weather was not so favorable as last year, and the results less satisfactory. In the early part of the season we had a great amount of rain, almost daily for several weeks, which delayed some of the planting, and the early and proper cultivation of other crops.

The continuous rains while the wheat was in bloom, more particularly the later varieties, prevented the proper fertilization by the pollen; the germs died out and the surrounding chaff with them. The foliage also seemed to die prematurely, and of course the remaining grain was not fully developed and properly matured.

Through midsummer we had a protracted drought, that materially shortened the corn and part of the potato crop, and also made lighter the late varieties of oats. The consideration of these influences leads me to the propriety and importance of having careful meteorological observations and records made and kept at each of the farms, which may, in a measure, explain the discordance of our different results. I am happy to inform you that in the new office building now being completed here we are having a room fitted up for the purpose.

During the past season we have made more than three hundrrd experiments with commercial fertilizers, which have caused us much labor and very little satisfaction, as we are not able to collect reliable information from them under existing circumstances and absence of legislation. Many of them, no doubt, are valuable manures, but in most cases we are kept in ignorance of their constituent elements; we do not know what we are applying to our land, nor whether the article of the same brand will contain the same ingredients the next season. We need legislation to require the publication of the proportions of potash, ammonia, phosphoric acid, sand, &c., in each, and compulsion to keep up the standard when published. I would suggest that hereafter we take not the trouble to experiment with any one that is not thus enlightened and guaranteed.

We have grown, the past season, many varieties of corn, potatoes, barley, oats, wheat, &c., and find a considerable confusion in the nomenclature. In some cases there appear to be several articles out under one name, and on the other side several names applied to one and the same article. There is room for the farms to do much good in making out descriptions and establishing names.

During nearly the whole season we have had more or less mechanics on hand to board and wait upon, in building a kitchen, wash house, office and store room and making sundry repairs. This has added considerably to our burthens and interfered with our farm work and use of teams. The farm crops have been reasonably well attended to, and the weighing and measuring, so far as reported, carefully done; a few blanks occur where we did not record, or else have lost the data. In a few cases the amount of new seeds received was so small that we think it unsafe to form estimates per acre from the produce.

CENTRAL EXPERIMENTAL FARM.

The tables contain, in detail, the entire results of the experiments made during the year, as well under the programme of the series of experiments prescribed by the Board, and since, from time to time, enlarged by the Professor of Agriculture, as the results of other experiments which suggested themselves to your assistant as likely to prove beneficial to the agricultural community.

In contemplating the design of these experiments, they seemed naturally divisible into *three classes;* the *object* of each being as *distinct* as the *ends* to be attained are *important.* I have, therefore, in view of these distinctions, although differing in this respect somewhat from the plan of the first annual report. classified the experiments, and arranged the same in *three tables.*

Table No. 1, covering five pages, from fourteen to eighteen, both inclusive, relates to *experiments upon the rotation of crops and modes of culture.*

Table No. 2, covering six pages, from eighteen to twenty-four, both inclusive, relates to *experiments testing the relative merits of fertilizers.*

And table No. 3, covering four pages, from twenty-five to twenty-eight, both inclusive, relates to *experiments testing the relative merits of the different varieties of grain, seeds and vegetables.*

The products of the *wheat plots,* in common with all the early sown wheat of Centre county, were very materially lessened by the *Hessian fly.* This insect, which for years had done but little injury in the vicinity of the Central Farm, set upon the wheat shortly after the blade had made its appearance, and utterly destroyed the vitality of a large portion of the plants.

Potatoes, barley, oats and corn suffered more or less from drought, which places the results below the products of last year.

Specimens of the numerous varieties of wheat, oats, barley and potatoes, as well as specimens of the rye and hay, were exhibited at the Inter-state fair, in Pittsburg, and at the fair of the Pennsylvania State Agricultural Society, in Scranton, and were awarded by each the highest premiums offered.

The *Jennings wheat* and the *Excelsior, White Schoenen* and *Somerset oats,* exhibited in the sheaf, as well as in the grain, attracted, by their excellence, considerable attention, and led to the inquiry how and at what prices they could be obtained for seed. Aware of the intention of the college to supply new and approved varieties of grain to farmers for seed, at low and reasonable rates, I took the liberty of publishing, without special instructions, that they could be obtained by writing to the Superintendent of the Central Experimental Farm, Agricultural College P.O., Centre county, Pa., who would place the same in any reasonable quantities upon the cars, at Bellefonte, in bags, to the designated address, at seventy-five cents per bushel, by weight, without additional charge, except fifty cents for a two-bushel bag and sixty cents for a two and one-half bushel bag. The committee on grain and seeds, at the State fair, having carefully compared a specimen of the White Schoenen oats, *imported* and placed on exhibition by the Commissioner of Agriculture, with the specimen exhibited by the Central Experimental Farm, *two years removed from the original importation*, reported that they discovered no perceptible difference in quality, weight or color.

In testing the relative merits of the commercial manures, I purchased in the market indirectly, to avoid suspicion, as suggested in your letter of instructions, a quantity of each species of the fertilizers donated, and applied the articles thus *purchased* on portions of the plots, side by side, with the *donated* articles, marking the boundaries of each distinctly. Having kept an eye upon the different sides of these lines, with a view to detect imposition, should it have been attempted, in the *donation* of a better article than *sold* under the *same denomination* in the market, I am happy to state that no difference whatever was perceptible at any stage of the growth or in the ultimate results of the crops under the applications made thereof, as presented in table No. 2.

The same tests, however, will be continued throughout the five years rotation, and differences, if any occur, will be marked and published as directed.

The two several tiers of plots, commencing with 201 and 301, have been suffered to remain continually in clover and timothy, with a view of being brought into corn and the other crops prescribed in the regular course of the five years rotation, and except plots from 226 to 241, used in testing the relative merits of fertilizers, have not been reported in connection with the *experimental plots*, simply because they have not yet been subjected to the *experimental tests of the programme.*

The tier commmencing with 301 will in course come into *corn* next spring; the tier commencing with 201 in the spring of 1872; after which every plot in the whole six tiers, numbering two hundred and sixty-four, will be annually reported, marking a distinct diversity and illustrating a distinct experiment in agriculture.

The experiment of the fertilizers upon the Sanford corn reported in table No. 2, the experiments upon the oats, barley and spring wheat received from James Fleming, of Toronto, Canada, through the Hon. Horace Capron, Commissioner of Agriculture, too late to leave a reasonable hope of success. The experiment upon the potato, oats, and the experiments upon the sixteen new varieties of the potato produced from seedlings, as reported in table No. 3, are the only experiments outside those prescribed in the original programme, and your letter of instructions of April last.

WESTERN EXPERIMENTAL FARM.

By direction of the local committee in charge I assumed the superintendency of this farm on the 15th day of February, 1870. As soon as the weather permitted I commenced operations. I found but two sections laid out, of 24 plots each, and I proceeded to lay out three full sections, of 44 plots each, as soon as possible. I also extended the two sections already laid out, to 44 plots each. Another new section was laid out, by direction of the Board of Trustees, for the purpose of experimenting in different varieties of grains, seeds and vegetables. Full particulars as to the time of planting, cutting and the products of each plot will be found in tabular statements annexed. Plots from 101 to 124, inclusive, which were in wheat, were sown in clover and timothy, as prescribed by the programme. Plots from 201 to 224, inclusive, were part of an old meadow, pretty well worn out. The grass was light, and it was almost impossible to keep separate and accurate accounts of the products of each. The grass was cut and housed, but no separate account kept of them, as there seemed to be no point in so doing. The yield of the hay on these plots is given in bulk, but no separate estimate on each plot can be given.

Plots from 301 to 344, inclusive, were laid out on wheat stubble, which had been sown in clover and timothy, mixed, and did not correspond exactly with the programme. The grass was light and was not cut, as it would not pay for the trouble. These plots are to be plowed up and put in corn in the spring of 1871. The balance of the plots were treated precisely as directed by the programme and letter of instructions. No experiments have been made upon the model part of the farm this year, except upon wheat sown this fall, which results will be reported next year in the annual report. The model part of the farm was laid out in fields, as per diagram, which necessitated a great deal of time and labor having to be done previous to harvest. About 350 rods of rail fence were removed and re-built upon the lines of fields, and about 100 rods repaired. The straw remaining over from last year was formed in piles, mixed with lime, and street scrapings hauled from town, and rotted down for fall use. Two hundred and forty-six wagon loads were thus made, which was all hauled out and used upon the farm.

I am pleased to be able to report, that I exhibited the products of the farm at the Inter-State fair, held at Pittsburg, Pa., September 12, 13, 14, 15, 16 and 17, and was awarded the second premium for the best display of potatoes. I also exhibited the products of the farm at the annual exhibition of the Indiana County Agricultural Society, held at Indiana, Pa., September 21, 22 and 23, and was awarded the premium for the best half bushel of oats, (Surprise,) and the premium for the best half bushel of corn, (Yellow Gourd,) and also an honorable mention for the display of products not entered for premiums.

at Bellefonte, in bags, to the designated address, at
bushel, by weight, without additional charge, ex
bushel bag and sixty cents for a two and one-
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A SYNOPSIS *of the* Results upon the Experimental
E. is used for Eastern, C. for Central, W. for Western, throughout these and other tables

	Number of plot	1.			2.											
	Treatment	Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow								
	Year	1869.			1869.			1869.								
FIRST TIER OF PLOTS. Corn.	Name of farm	Eastern.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.				
	Pounds of corn, ears	....	540	280	....	500	315	....	518	297½	....	537	[illegible]			
	Pounds of fodder	....	550	270	....	490	295	....	520	237½	....	515	255			
	Page of report	....	23	48	....	23	43	....	23	43	....	23	43			
Barley and oats.	Year	1870.			1870.			1870.			1870.					
	Name of farm	Barley. E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	Oats. E.	C.	
	Pounds of grain	144	110	62	132	104	61	135	200	69	138½	174	59	208 13-16	183	[illegible]
	Pounds in straw	344	230	185	320	170	182	328	310	192	328	260	173	552	440	
	Page of report	36	63	85	36	63	85	36	63	85	36	63	85	89	63	85

A SYNOPSIS—CONTINUED.

		Number of plot	6.			7.			8.			9.					
		Treatment	Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan for fallow.			Common plow.			an t.		
		Year	1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	....	565	315	....	558	262½	....	575	280	....	585	236¼	....	550	271¼
		Pounds of fodder	....	515	325	....	540	252½	....	525	205	....	560	223¾	....	520	289
		Page of report	....	23	43	....	23	43	....	23	43	....	23	43	....	23	43
	Barley and oats.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	Oats. E.	C.	W.	Fallow. E.	C.	W.	E.	C.	W.	Barley. E.	C.	W.	E.	C.	W.
		Pounds of grain	201 9-16	172	106	....	....	....	....	....	....	124	106	50	122	130	52
		Pounds in straw	506	420	311	....	....	....	....	....	....	308	275	149	314	300	142
		Page of report	37	64	85	....	....	....	....	....	....	36	65	85	36	65	85

A SYNOPSIS *of the Results upon the Experimental Plots of the Programme.*

E. is used for Eastern, C. for Central, W. for Western, throughout these and other tables. Page of report refers to the annual reports of 1869–70.

Number of plot			1.			2.			3.			4.			5.		
Treatment			Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow.		
Year			1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn.	Name of farm	Eastern.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	Eastern.	C.	W.
		Pounds of corn, ears	....	540	280	....	500	315	....	518	297½	....	537	280	....	540	280
		Pounds of fodder	....	550	270	....	490	295	....	520	237½	....	515	255	....	540	260
		Page of report	....	23	43	....	23	43	....	23	43	....	23	43	....	23	43
	Barley and oats.	Year	1870.			1870.			1870.			1870.			1870.		
			Barley.												Oats.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	144	110	62	132	104	61	135	200	69	138½	174	59	208 13–16	183	141
		Pounds in straw	344	230	185	320	170	182	328	310	192	328	260	173	552	440	348
		Page of report	36	63	85	36	63	85	36	63	85	36	63	85	89	63	85

A SYNOPSIS—CONTINUED.

Number of plot			6.			7.			8.			9.			10.		
Treatment			Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan for fallow.			Common plow.			Sub-soil plow for corn, Michigan for wheat.		
Year			1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	....	565	315	....	558	262¼	....	575	280	....	585	236¼	....	550	271¼
		Pounds of fodder	....	515	325	....	540	252½	....	525	205	....	560	223¾	....	520	289
		Page of report	....	23	43	....	23	43	....	23	43	....	23	43	....	23	43
	Barley and oats.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	Oats. E.	C.	W.	Fallow. E.	C.	W.	E.	C.	W.	Barley. E.	C.	W.	E.	C.	W.
		Pounds of grain	201 9-16	172	106	....	....	....	....	....	....	124	106	50	122	130	52
		Pounds in straw	506	420	311	....	....	....	....	....	....	308	275	149	314	300	142
		Page of report	37	64	85	....	....	....	....	....	....	36	65	85	36	65	85

A SYNOPSIS—CONTINUED.

Number of plots			11.			12.			13.			14.			15.		
Treatment			Sub-soil plow for potatoes, Michigan for wheat.			Common plow, butt grain.			Sub-soil plow for corn, Michigan for wheat, butt grain.			Commom plow, end grain.			Sub-soil plow for corn, Michigan for wheat, end grain.		
Year			1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn and potatoes.		Potatoes, lbs.			Corn.											
		Name of farm	E.	C.	W.	E	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ear	....	l. & w. 410lbs med. 419lbs small 486lbs cut, 500lb 1,815	1,489	...	525	262½	....	530	218¾	....	510	262⅓	....	560	280
		Pounds of fodder	....		....	...	490	217½	....	440	171¼	....	460	327½	....	520	300
		Page of report	....	23	43	....	23	43	....	24	44	....	24	44	....	24	44
	Barley.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	125	120	56	....	125	58	....	164	45	....	177	58	....	132	60
		Pounds of straw	812	315	148	....	220	152	....	285	146	....	260	169	....	245	160
		Page of report	86	65	85	....	65	85	....	66	86	....	66	86	....	66	86

A SYNOPSIS—CONTINUED.

Number of plot............		16.			17.			18.			19.			20.		
Treatment..............................		Sub-soil and Michigan plows, alternate years.			Common plow, lime, 50 bushels ℔ acre.			Corn, sub-soil plow, wheat, Michigan plow, lime, 500 bushels ℔ acre.			Common plow, lime, 100 bu. ℔ acre.			Corn, sub-soil plow, wheat, Michigan plow, lime, 100 bushels ℔ acre.		
Year......................................		1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn.	Potatoes, lbs.			Corn, cont'd.											
	Name of farm..........	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Pounds of corn, ears	....	½ l. & w.. 945	1,428	....	532	297½	....	500	350	....	547	385	....	574	420
	Pounds of fodder....	....	½ cut...... 845	....	....	520	322½	....	471	340	....	490	225	....	484	350
			1,790													
	Page of report...	....	24	44	....	24	44	....	24	44	....	24	44	....	24	44
	Year.........................	1870.			1870.			1870.			1870.			1870.		
	Barley.	Potatoes, lbs.			Barley, con'd											
	Name of farm..........	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Pounds of grain, &c	½ l. & w. 531	½ l. & w. 220	L. & w.. 589¾	122⅛	117	63	125⅛	110	61½	104¾	96	72½	122⅜	150	74½
	Pounds in straw....	½ cut..... 448	½ cut..... 325	Cut...... 476½	372	270	172	346	210	178	376	210	180	338	300	183
		965½	545	1,066¼												
	Page of report	....	66	86	36	68	86	34	68	86	36	68	86	36	68	86

A SYNOPSIS—CONTINUED.

Number of plot			21.			22.			23.			24.			25.		
Treatment			Common plow. Lime, 200 bushels per acre.			Corn, sub-s'l pl'w; wheat, Michigan plow.—Lime, 200 bushels per acre			Seed.—Wheat and barley, 1 bushel; corn, 3 stalks to a hill, at 3 feet; clover and timothy, 3 quarts.			Seed.—Wheat, 2 bushels; barley, 3 bushels; corn, 1 stalk at 12 in.; clover and timothy, 6 quarts.			Common plow—Lime, none.		
Year			1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ear	....	485	437½	....	531	490	....	506	402½	....	548	411¼	....	508	....
		Pounds of fodder	....	460	365	....	480	414	....	500	443½	....	490	356¼	....	460	....
		Page of report	....	24	44	....	24	44	....	24	44	....	24	44	....	25	....
	Barley.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	25⅛	130	86½	165½	144	88½	102¼	130	69¼	118⅛	109	41¼	104 1-16	125	41½
		Pounds in straw	316	270	195	208	310	192	332	200	142	312	245	151	296	258	121
		Page of report	36	69	86	36	69	86	36	67	86	36	67	86	36	69	87

A SYNOPSIS—CONTINUED.

			26.			27.			28.			29.			30.		
		Number of plot	26.			27.			28.			29.			30.		
		Treatment	Corn, sub-soil plow; wheat, Michigan plow. Lime, none.			Ter Hœven's horn dust.			No manure.			Miller & Smith's superphosphate of lime.			Barnyard manure.		
		Year	1869.			1869.			1869.			1869.			1869.		
FIRST TIER OF PLOTS.	Corn.	Name o farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ear	....	480	....	....	440	....	....	440	....	....	535	....	....	465	....
		Pounds of fodder	....	430	....	....	410	....	....	400	....	....	500	....	....	460	....
		Page of report	....	25	....	....	27	....	....	27	....	....	27	....	....	27	....
	Barley and oats.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	Barley, contin'd. E.	C.	W.	Oats. E.	C.	W	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	105⅛	123	44¼	183 9-16	158	69½	164 3-16	159	48¾	190 5-16	164	67¼	187½	178	52
		Pounds of straw	288	255	129	462	590	313	390	500	207	470	520	275	448	540	243
		Page of report	36	69	87	37	70	87	37	70	87	87	70	87	37	70	87

A SYNOPSIS—CONTINUED.

Number of plot			31.			32.			33.			34.			35.		
Treatment			Miller & Smith's ground bone.			Lister Bros.' ground bone.			Lister Bros.' bone meal.			Lister Bros.' bone flour.			Harrisburg Fertilizing Co.'s superphosphate of lime.		
Year			1870.			1870.			1870.			1870.			1870.		
FIRST TIER OF PLOTS.	Oats.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	174 5-16	191	....	173 15-16	214	....	175	179	64¼	182	188	....	....	189	53½
		Pounds of straw	436	510	....	440	540	....	414	585	282	416	540	....	....	513	209
		Page of report	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Oats.	Number of plot	36.			37.			38.			39.			40.		
		Treatment	Harrisburg Fertilizing Co.'s animal compost.			Harrisburg Fertilizing Co.'s pure gr'nd bone.			Breinig & Helfrich's complete bone manure.			Watson & Clark's superphosphate.			Lister Bros.' superphosphate.		
		Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E*.	C.	W.*
		Pounds of grain	....	192	60¾	....	196	63¼	196	198	58¼	192 15-16	175	58¾	187 5-16	212	52½
		Pounds of straw	....	540	240	....	510	287	432	490	261	412	461	249	434	490	238
		Page of report	37	72	87	37	72	87	37	72	87	37	72	87	37	73	87

*S. C. bone deposit.

A SYNOPSIS—Continued.

Number of plot			101.			102.			103.			104.			105.		
Treatment			Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow.		
Year			1869.			1869.			1869.			1869.			1869.		
SECOND TIER OF PLOTS.	Barley and oats in 1869.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	B'ley	....	60½	....	....	67¼	....	193½	80	....	209½	79	Oats.	257	170
		Pounds of straw		....	240	....	....	252	....	490	343	....	505	340		700	364
		Page of report	....	....	45	....	....	45	....	25	45	....	25	45	....	25	45
	Wheat in 1870.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	....	64	124¼	....	65	131½	....	79	109	....	95	149	....	79½	15
		Pounds of straw	....	250	308	....	300	326	....	365	415	....	300	378	....	300	201
		Page of report	....	63	89	....	63	89	....	63	89	....	63	89	....	64	89

A SYNOPSIS—CONTINUED.

Number of plots			106.			107.			108.			109.			110.		
Treatment			Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan plow for fallow.			Common plow.			Sub-soil plow for corn, Michigan for wheat.		
Year			1869.			1869.			1869,			1869.			1869.		
SECOND TIER OF PLOTS.	Barley and oats.	Name of farm	E.	C,	W.	E.	C,	W.	E.	C.	W.	E.	C,	W.	E.	C,	W.
		Pounds of grain	Oats.	260	168	B'ley	....	61	....	....	61	....	....	47	....	....	62¼
		Pounds of straw		690	360		....	154	....	....	150	....	....	123	....	....	143
		Page of report	....	26	45	....	....	45	....	....	45	....	....	45	....	....	45
	Wheat.	Year	1870.			1870.			1870,			1870,			1870.		
		Name of farm	E,	C.	W,	E.	C.	W.	E.	C.	W,	E.	C.	W.	E.	C.	W.
		Pounds of grain	....	71	173¼	....	92½	187½	....	99	150	....	85	116½	....	85½	238
		Pounds of straw	....	260	413	....	395	427	....	390	369	....	330	313	....	380	467
		Page of report	....	64	89	....	64	89	....	64	89	....	65	89	....	65	89

A SYNOPSIS—CONTINUED.

		Number of plots	111.			112.			113.			114.			115.		
		Treatment	Sub-soil plow for potatoes, Michigan for wheat.			Common plow.—Butt grain of corn.			Sub-soil plow for corn, Michigan for wheat. Butt grain.			Common plow.—End grain.			Sub-soil plow for corn, Michigan for wheat. End grain.		
		Year	1869.			1869.			1869.			1869.			1869.		
SECOND TIER OF PLOTS.	Barley.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain			49½			51½			67			50			58
		Pounds of straw			130			134			170			140			162
		Page of report			45			45			46			46			46
	Wheat.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain		89½	260¼		81	198		164	261		110	177		121½	209
		Pounds of straw		335	462		285	420		375	450		310	463		370	457
		Page of report		65	89		65	89		66	90		66	90		66	90

A SYNOPSIS—CONTINUED.

		Number of plot	116.			117.			118.			119.			120.	
		Treatment	Sub-soil and Michigan plows, alternate years.			Common plow, lime, fifty bushels per acre.			Sub-soil plow for corn, Michigan for wheat, lime, fifty bushels per acre.			Common plow, lime, 100 bushels per acre.			Sub-soil plow for corn, Michigan for wheat, lime, 100 bushels per acre.	
		Year	1869.			1869.			1869.			1869.			1869.	
SECOND TIER OF PLOTS.	Barley and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	Potatoes.	lbs. ½ l. & w.. 725	1,288 pounds.	Barley.	169	62	....	168	61½	....	171	72	....	204½	74
		Pounds of straw	.....	½ cut...... 686 1,411	....	.....	469	165	....	360	163	....	390	175	....	460	185
		Page of report	....	26	....	....	26	....	....	26	....	....	26	....	....	26	....
	Wheat and potatoes.	Year	1870.			1870.			1870.			1870.			1870.	
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	Potatoes.	lbs. L. & w..... 280	lbs. L. & w.. 692¼	Wheat.	110	130½	....	82	134	....	88	131½	....	81	126
		Pounds of straw	.....	Cut 340 620	Cut 634¼ 1,326½	.....	305	309	....	210	315	....	320	319	....	315	315
		Page of report	....	66	90	....	68	90	....	68	90	....	68	90	....	68	90

A SYNOPSIS—Continued.

Number of plot			121.			122.			123.			124.			125.		
Treatment			Common plow.—Lime, 200 bushels per acre.			Corn.sub-soil pl'w; wheat, Michigan plow. Lime, 200 bushels per acre.			Seed.—Wheat and barley, 1 bushel; corn, 3 stalks to a hill, at 3 feet; clover and timothy, 3 quarts.			Seed.—Wheat, 2 bushels; barley, 3 bushels; corn, 1 stalk, at 12 in.; clover and timothy, 6 quarts.			Common plow.—Lime, none.		
Year			1869.			1869.			1866.			1869.			1869.		
SECOND TIER OF PLOTS.	Barley.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	....	189¾	71	....	157½	60½	....	185½	49½	....	178	48½	....	188	....
		Pounds in straw	....	365	165	....	388	160	....	400	143½	....	440	143¾	....	410	....
		Page of report	....	26	46	....	26	46	....	26	46	....	26	46	....	26	....
	Wheat.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	....	69	138	....	71	146	....	69	72	....	89	48	....	82	....
		Pounds in straw	....	260	301½	....	250	212	....	185	203	....	295	147	....	250	....
		Page of report	....	69	90	....	69	90	....	67	90	....	67	90	....	69	....

A SYNOPSIS—CONTINUED.

		Number of plot	126.			127.			128.			129.			130.		
		Treatment	Corn, sub-soil plow, wheat Michigan plow.—Lime none.			Ter Hœven's horn dust.			No manure.			Miller & Smith's superphosphate of lime.			Barn-yard manure.		
		Year	1869.			1869.			1869.			1869.			1869.		
SECOND TIER OF PLOTS.	Barley.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	....	185	....	....	185	....	....	160	....	....	188	....	....	197	....
		Pounds of straw	....	420	....	....	470	....	....	430	....	....	450	....	....	470	....
		Page of report	....	26	....	....	27	....	....	27	....	....	28	....	....	28	....
	Wheat.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of grain	....	87	....	....	25	....	....	23	....	....	26	....	....	20	....
		Pounds in straw	....	260	....	....	125	....	....	125	....	....	132	....	....	150	....
		Page of report	....	69	....	....	67	....	....	67	....	....	67	....	....	67	....

A SYNOPSIS—CONTINUED.

	Number of plot	216.			227.			228.			229.			230.		
	Treatment	Common plow.			Ter Hœven's horn dust.			No manure.			Miller & Smith's superphosphate of lime.			Barn-yard manure.		
	Year	1869.			1870.			1870.			1870.			1870.		
THIRD TIER OF PLOTS. Clover, timothy and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Pounds	Potatoes.	½ l. & w. 420 ½ cut...... 400 820	....	Clover & tim.	750	....	....	650	....	....	760	....	....	790	....
	Page of report	....	25	....	....	28	....	....	28	....	....	28	....	....	28	....
	Number of plot	216.			231.			232.			233.			234.		
	Treatment	Common plow.			Miller & Smith's ground bone.			Lister Brothers' ground bone.			Lister Brothers' bone meal.			Lister Brothers' bone flour.		
	Year	1870.			1870.			1870.			1870.			1870.		
	Name of Farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Pounds	Potatoes.	½ l. & w., 240 ½ cut. 245 485	½ l. & w., 1,049½ ½ cut. 849 1,898½	Clover & tim.	790	....	....	790	....	....	650	....	....	650	....
	Page of report	....	67	....	....	71	....	....	71	....	....	71	....	....	71	....

A SYNOPSIS—CONTINUED.

		Number of plot	235.			236.			237.			316.			227.		
		Treatment	Harrisburg Fertilizing Co.'s superph'e of lime.			Harrisburg Fertilizing Co.'s animal compost.			Harrisburg Fertilizer Co.'s pure ground bone.			Common plow.—Potatoes.			Ter Hœven's horn dust.		
		Year	1870.			1870.			1870.			1869.			1869.		
THIRD TIER OF PLOTS.	Clover and timothy.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	Potatoes. E.	C.	W.	Clover and timothy. E.	C.	W.
		Pounds	....	660	....	....	710	....	....	790	....	....	½ med.... 520 ½ small.. 505 1,025	....	.....	740	....
												1870.					
												Potatoes. E.	C.	W.			
												....	½ med.... 290 ½ small.. 240 530	½ med ... 689 ½ small.. 512½ 1,201½			
		Page of report	....	72	....	....	72	....	....	72	....	....	67	97	....	28	....
		Number of plot	238.			239.			240.			228.			229		
		Treatment	Breinig & Helfrich's complete bone manure.			Watson & Clark's superphosphate.			Lister & Brother's superphosphate.			No manure.			Miller & Smith's superphosphate of lime.		
		Year	1870.			1870.			1870.			1869.			1869.		
	Clover and timothy.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds	....	810	....	....	790	....	....	740	....	....	460	....	....	720	....
		Page of report	....	72	....	....	73	....	. ...	73	....	....	28	....	....	28	....

A SYNOPSIS—Continued

Number of plot			401.			402.			403.			404.			405.	
Treatment			Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan for wheat.			Common plow.	
Year			1870.			1870.			1870.			1870.			1870.	
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	560	490	330	464	510	335	494	535	350	464	540	354	512	480	388
		Pounds of fodder	....	280	406	....	250	430	....	255	400	....	230	438	....	235	400
		Page of report	44	63	91	44	63	91	44	63	91	44	63	91	44	64	91
	Corn and potatoes.	Number of plot	406.			407.			408.			409.			410.		
		Treatment	Sub-soil plow for corn, Michigan for wheat.			Common plow.			Sub-soil plow for corn, Michigan fallow.			Common plow.			Sub-soil plow for corn, Michigan for wheat.		
		Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	490	550	340	534	422	347	520	400	609	524	380	600	476	460	640
		Pounds of fodder	....	240	476	....	205	454	....	215	445	....	210	338	....	210	540
		Page of report	44	64	91	44	64	91	44	64	91	44	65	91	44	65	91

A SYNOPSIS—CONTINUED.

	Number of plot...................	411.			412.			413.			414.			415.		
	Treatment..........................	Sub-soil plow for potatoes, Michigan plow for wheat.			Common plow, butt grain.			Sub-soil plow for corn, Michigan plow for wheat. Butt grain.			Common plow, end grains.			Sub-soil plow for corn, Michigan plow for wheat. End grain.		
	Year................................	1870.			1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS. Corn and potatoes.	Name of farm.....	Potatoes. E.	C.	W.	Corn. E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Lbs. of corn, ears,	L. & w. 226½ lbs ¼ m. s., 214½ lbs ¼ sm ... 160½ lbs ¼ cut... 219 lbs	¼ l. & w. 160 lbs ¼ med...175 lbs ¼ cut .....125 lbs ¼ sm......145 lbs	¼ l. & w. 298 lbs ¼ med... 261 lbs ¼ cut..... 243 lbs ¼ sm......202 lbs	524	425	550	428	429	590	506	435	596	408	410	661
	Lbs. of fodder....	820½	605	1,004	.....	200	580	....	195	597	....	200	550	....	200	456
	Page of report....	44	65	91	44	65	91	44	66	92	44	66	92	44	66	92
	Number of plot...	416.			417.			418.			419.			420.		
	Treatment..........	Sub-soil and Michigan plows, alternate years.			Common plow, lime, 50 bushels per acre.			Corn sub-soil plow, wheat Michigan plow. Lime. 50 bushels per acre.			Common plow, lime, 100 bushels per acre.			Corn sub-soil plow, wheat Michigan plow. Lime, 100 bushels per acre.		
	Year	1870.			1870.			1870.			1870.			1870.		
	Name of farm.....	Potatoes. E.	C.	W.	Corn. E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	
	Lbs. of corn, ears,	....	½ med..... 200 ½ small... 205 465	1,263	490	430	697	456	470	680	516	419	600	480	445	686
	Lbs. of fodder....	....		....	.....	255	500	....	220	588	....	310	540	....	230	540
	Page of report....	....	68	92	44	68	92	44	68	92	44	68	92	44	68	92

A SYNOPSIS—CONTINUED.

		Number of plot	421.			422.			423.			424.			425.		
		Treatment	Common plow.—Lime, 200 bush. per acre.			Corn, sub-s'l pl'w, wheat, Michigan plow, lime, 200 bus. per acre.			Seed—Wheat and b'ley, 1 bu., corn, 3 stalks to hill at 3 ft., C. & T., 3 qts.			Seed—Wh't, 2 bu., b'ley, 1 bu., corn, 1 stalk at 12 in., Clo. & T'y, 6 qts.			Common plow. Lime, none.		
		Year	1870.			1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	518	540	705	500	565	732	528	450	580	514	490	520	....	520	316
		Pounds of fodder	....	300	770	....	290	780	....	305	668	....	280	630	....	270	435
		Page of report	44	69	92	44	69	92	44	67	92	44	67	92	....	69	93
		Number of plot	426.			427.			428.			429.			430.		
		Treatment	Corn, sub-soil plow, wheat, Michigan plow.—Lime, none.			Ter Hœven's horn dust.			No manure.			Miller & Smith's superphosphate of lime.			Barn-yard manure.		
		Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	....	470	300	520	510	388	496	450	310	580	525	366	558	530	404
		Pounds of fodder	....	290	435	....	270	440	....	260	435	....	280	490	....	300	476
		Page of report	....	69	93	44	70	93	44	70	93	44	70	93	44	70	93

A SYNOPSIS—CONTINUED.

	Number of plot	413.	414.	415.
	Treatment	plow … Michi-	Common plow, end grains.	Sub-soil plow for corn, Michigan plow for wheat. End grain.
	Year			1870.

		Number of plot	431.			432.			433.			434.		
		Treatment	Miller & Smith's ground bone.			Lister Brothers' ground bone.			Lister Brothers' bone meal.			Lister Brothers' [illegible]		
		Year	1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	528	510	319	494	525	279	488	525	383	486	480	[illegible]
		Pounds of fodder	....	260	473	....	250	361	....	270	489	....	250	[illegible]
		Page of report	44	71	93	44	71	93	44	71	93	44	71	93

	C.	W.
		661
		456

		Number of plot	436.			437.			438.			439.					
		Treatment	Harrisburg Fertilizing Co.'s animal compost.			Harrisburg Fertilizing Co.'s pure ground bone.			Breinig & Helfrich's complete bone manure.			Watson & Clark's superphosphate.			Lister Bro… superphosph…		
		Year	1870.			1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.*	C.	W.*
		Pounds of corn, ears	452	450	380	580	430	420	564	425	390	560	433	367	508	458	345
		Pounds of fodder	....	250	479	....	260	451	....	260	476	....	265	428	....	258	416
		Page of report	44	72	93	44	72	94	44	72	94	44	73	94	44	73	93

* South Carolina bone deposit.

A SYNOPSIS—CONTINUED.

Number of plot				441.											
Portion of plot				¼.			¼.			¼.					
Treatment				Ter Hœven's horn dust.			No manure.			Miller & Smith's superphosphate.			Barn.yard manure.		
Year				1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	Potatoes.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds		224½	240	161¼	229½	210	112¾	337	240	149½	369½	330	146
		Page of report		47	74	94	47	74	94	47	74	94	47	74	94
		Number of plot		442.											
		Portion of plot		¼.			¼.			¼.			¼.		
		Treatment		Miller & Smith's ground bone.			Lister Brothers' ground bone.			Lister Brothers' bone meal.			Lister Brothers' bone flour.		
		Year		1870.			1870.			1870.			1870.		
		Name of farm	Potatoes.	E.	C.	W.	E.*	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds		301½	270	....	331½	240	....	286	240	131¼	290¾	245	....
		Page of report		47	74	....	47	74	....	47	74	94	47	74	....

* Lister Brothers' superphosphate.

A SYNOPSIS—CONTINUED.

		Number of plot	431.			432.			433.			434.			435.		
		Treatment	Miller & Smith's ground bone.			Lister Brothers' ground bone.			Lister Brothers' bone meal.			Lister Brothers' bone flour.			Harrisburg Fertilizing Co.'s superphosphate of lime.		
		Year	1870.			1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of corn, ears	528	510	319	494	525	279	488	525	383	486	490	256	534	440	420
		Pounds of fodder	....	260	473	....	250	361	....	270	489	....	250	309	....	235	467
		Page of report	44	71	93	44	71	93	44	71	93	44	71	93	44	72	93
	Corn and potatoes.	Number of plot	436.			437.			438.			439.			440.		
		Treatment	Harrisburg Fertilizing Co.'s animal compost.			Harrisburg Fertilizing Co.'s pure ground bone.			Breinig & Helfrich's complete bone manure.			Watson & Clark's superphosphate.			Lister Brothers' superphosphate.		
		Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.*	C.	W.*
		Pounds of corn, ears	452	450	380	580	430	420	564	425	390	560	483	367	508	458	345
		Pounds of fodder	....	250	479	....	260	451	....	260	476	....	265	428	....	258	416
		Page of report	44	72	93	44	72	94	44	72	94	44	73	94	44	73	93

* South Carolina bone deposit.

A SYNOPSIS—CONTINUED.

		Number of plot		441.											
		Portion of plot		¼.			¼.			¼.			¼.		
		Treatment		Ter Hœven's horn dust.			No manure.			Miller & Smith's superphosphate.			Barn.yard manure.		
		Year		1870.			1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	Potatoes.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C	W.
		Pounds		224½	240	161¼	229½	210	112¾	337	240	149½	369½	330	146
		Page of report		47	74	94	47	74	94	47	74	94	47	74	94
		Number of plot		442.											
		Portion of plot		¼.			¼.			¼.			¼.		
		Treatment		Miller & Smith's ground bone.			Lister Brothers' ground bone.			Lister Brothers' bone meal.			Lister Brothers' bone flour.		
		Year		1870.			1870.			1870.			1870.		
		Name of farm	Potatoes.	E.	C.	W.	E.*	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds		301½	270	....	331½	240	....	286	240	131¼	290¾	245	....
		Page of report		47	74	....	47	74	....	47	74	94	47	74	....

* Lister Brothers' superphosphate.

A SYNOPSIS—CONTINUED.

Number of plot			443.												
Portion of plot			¼.				¼.			¼.			¼.		
Treatment			Harrisburg Fertilizer Co.'s superphosp'e				Harrisburg Fertilizer Co.'s animal compost.			Harrisburg Fertirizer Co.'s pure ground bone.			Breinig & Helfrich's complete bone manure.		
Year			1870.				1870.			1870.			1870.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	Potatoes.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds		....	270	....	....	275	....	....	260	....	259½	220	⅓. 141¼
		Page of report	....	....	74	....	....	74	....	....	74	....	47	74	94

Number of plot			444.							416.		
Portion of plot			¼.				¾.					
Treatment			Watson & Clark's superphosphate of lime.				Lime and salt—8 bushels of lime and 1 bushel of salt.			Sub-soil and Michigan plows — alternate years.		
Year			1870.				1870.			1869.		
FIFTH TIER OF PLOTS.	Corn and potatoes.	Name of farm	Potatoes.	E.	C.	W.	E.*	C.	W.	E.	C.	W.
		Pounds		258	290	....	216¾	500	....	......	med...585 sm..... 600 1, 185	.....
		Page of report		47	74	....	47	74	....	......	25	.....

* ¾ South Carolina bone deposit.

A SYNOPSIS—CONTINUED.

	Number of plot	501.			502.			503.			501.			502.		
	Varieties	Excelsior oats.			Saxonian barley.			White Schoenen oats.			Talavera wheat.			Talavera wheat.		
	Year	1869.			1869.			1869.			1870.			1870.		
SIXTH OF THE PLOTS.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Pounds of grain	....	237	....	....	193	....	....	257	....	....	16	....	....	17½	....
	Pounds in straw	....	725	....	....	650	....	....	780	....	....	130	....	....	90	....
	Page of report	....	28	....	....	28	....	....	28	....	....	75	....	....	75	....
	Number of plot	504.			505.						503.			504.		
	Varieties	Probstier barley.			Somerset oats.						Polish wheat.			Polish wheat.		
	Year	1869.			1869.						1870.			1870.		
	Name of farm	E.	C.	W.	E.	C.	W.				E.	C.	W.	E.	C.	W.
	Pounds of grain	....	170	....	....	206	....	....	....	....	....	34	....	....	32	....
	Pounds in straw	....	520	....	....	525	....	....	....	....	....	140	....	....	140	....
	Page of report	....	29	....	....	29	....	....	....	....	....	75	....	....	75	....

A SYNOPSIS—CONTINUED.

SIXTH TIER OF PLOTS.

Number of plot	505.			506.			507.			508.			509.		
Varieties	Polish wheat.			Towzelle wheat.			Towzelle wheat.			Jennings wheat.			Bremen rye.		
Year	1870.			1870.			1870.			1870.			1870.		
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Pounds of grain		85			83¼			73½			112			164½	
Pounds in straw		142			390			350			360			570	
Page of report		75			75			75			75			78	
Number of plot	510.			511.			512.			513.			514.		
Varieties	Excelsior oats.			White Poland oats.			White Schoenen oats.			Somerset oats.			Surprise oats.		
Year	1870.			1870.			1870.			1870.			1870.		
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Pounds of grain	195	189	101	179¼	186	87½	169¾	205	83½	169 13-16	152	87¾	191⅛	185	92
Pounds of straw	496	540	342	424	440	303	366	460	285	404	440	294	440	560	315
Page of report	37	76	95	37	76	95	37	76	95	37	76	95	37	76	95

A SYNOPSIS—CONTINUED.

SIXTH TIER OF PLOTS.

Number of plot	515.			516.			517.			518.			519.		
Varieties	White Swedish oats.			Prince Edward oats.			Belgian oats.			Black Tartary oats.			Black Swedish oats.		
Year	1870.			1870.			1870.			1870.			1870.		
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Pounds of grain	183¾	160	....	205½	182	....	185 3-16	192	61¾	191⅛	159	....	171¼	109	58
Pounds of straw	458	540	....	470	510	....	410	460	221	538	470	....	514	350	211
Page of report	37	76	....	37	76	....	37	76	95	37	76	....	37	76	95
Number of plot	520.			521.			522.			523.			524.		
Varieties	Black Poland oats.			Black Norway oats.			Black Hungarian oats.			Probstier barley.			Saxonian barley.		
Year	1870.			1870.			1870.			1870.			1870.		
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Pounds of grain	221¾	173	59½	226½	188	83½	225	135	34½	64⅜	70½	....	86⅛	64	73½
Pounds of straw	504	440	207	524	515	293	500	390	168	292	240	....	304	230	267
Page of report	37	76	95	37	76	95	37	77	95	36	77	....	36	77	95

A SYNOPSIS—CONTINUED.

Number of plot	525.			526.			527.			528.			529.		
Varieties	Common four-rowed barley.			L. E. Rottingham barley.			Golden Melon seed barley.			Chevalier barley.			Brewer's Delight barley.		
Year	1870.			1870.			1870.			1870.			1870.		
SIXTH TIER OF PLOTS.															
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Pounds of grain	126⅜	122½	61	86⅝	49	....	78¼	96	....	66	109	80	84¾	118	....
Pounds of straw	322	390	241	301⅓	240	....	277⅓	340	....	261½	290	242	304	340	....
Page of report	36	77	96	36	77	....	36	77	....	36	77	96	36	77	....
Number of plot	530.						531.								
Portion of plot	½.			½.			½.			½.					
Variety	Early Rose potatoes.			Early Goodrich potatoes.			Climax potatoes.			Common Mercer potatoes.					
Year	1870.			1870.			1870.			1870.					
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.			
Pounds	483½	250	298½	525½	305	327	460½	300	216	341	151	345½			
Page of report	47	78	96	47	78	96	47	78	96	47	78	96			

A SYNOPSIS—Continued.

Number of plot		532.					
Portion of plot		½.			½.		
Varieties		Harrison potatoes.			Cuzco potatoes.		
Year		1870.			1870.		
SIXTH TIER OF PLOTS.	Name of farm	E.	C.	W.	E.	C.	W.
	Pounds	838	250	261½	761	305	287½
	Page of report	47	78	96	47	78	96
	Number of plot	533.					
	Portion of plot	½.			½.		
	Varieties	White Peach Blow potatoes.			Garnett Chili potatoes.		
	Year	1870.			1870.		
	Name of farm	E.	C.	W.	E.	C.	W.
	Pounds	371	200	482	570¾	150	293
	Page of report	47	78	96	47	78	96

TABLE A—*Containing an analysis of the foregoing Synopsis, so far as relates to the results of Experiments in the Rotation of Crops and Modes of Culture.*

	Product per acre of the plots plowed with the common plow.			Product per acre of the plots plowed with the sub-soil and Michigan plows.			Product per acre of the plots planted one stalk every foot.			Product per acre of the plots planted three stalks every three feet.			Product per acre of the plots planted with perfect grains.		
Year	1869.			1869.			1869.			1869.			1869.		
Name of farm.....	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Bus. of corn, ears.	....	121 2-35	68 21·35	....	125 8-35	73 21-35	....	125 9-35	94	....	115 24-35	92	....	123 7-35	76 4-35
Year	1870.			1870.			1870.			1870.			1870.		
Name of farm.....	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
Bus. of corn, ears..	118 12 35	105 1-35	113 34-35	107 3-35	109 2·35	123 15-35	117 17-35	112	131 7-35	120 24-35	91 15·35	132 20·35	101 29·35	99 13-35	105 22-35

	Product per acre of the plots planted with butt grains.			Product per acre of the plots planted with end grains.			Product per acre of the Barley plots.—Seed, two bus. per acre.			Product per acre of the Barley plots.—Seed, one bus. per acre.			Product per acre of the Barley plots.—Seed, three bus. per acre.		
Year	1869.			1869.			1869.			1869.			1869.		
Name of farm......	E.	C.	W.	E.	C.	W.	Barley. E.	C.	W.	E.	C.	W.	E.	C.	W.
Bus. of corn. ears .	....	120	55	....	122	62	......	30	10 35-47	....	31 22-47	8 12-47	....	30 14-47	8 12-47
Year	1870.			1870.			1870.			1870.			1870.		
Name of farm.....	E.	C.	W.	E.	C.	W.	Barley. E.	C.	W.	E.	C.	W.	E.	C.	W.
Bus. of corn, ears..	91 23-35	97 21-35	135 19-35	104 16-35	96 20-35	143 23·35	19 42-47	22 40-47	10 21-47	17 19-47	22 6-47	11 37-47	20 5-47	18 26-47	....

TABLE A—CONTINUED.

			Product per acre of plots from 101 to 122—seed 1½ bushels per acre.			Product per acre of plot 123—seed 1 bushel per acre.			Product per acre of plot 124—seed 2 bushels per acre.			Product per acre of plots 105 and 106, following the oats rotation.			Product per acre of plots 107 and 108, following the fallow rotation.		
SECOND TIER.	Wheat.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm,	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bus. of grain..	....	11 58-60	21 48-60	....	9 12-60	9 36-60	....	11 32-60	6 24-60	....	10 2-60	....	....	12⅜	22½

			Product per acre of the plots plowed with the sub-soil plow for corn.			Product per acre of the plots plowed with the common plow for corn.		
SECOND TIER.	Barley.	Year	1870.			1870.		
		Name of farm...	E.	C.	W.	E.	C.	W.
		Bushels of grain..	20 38-47	23 13-47	10 15-47	18 18-47	22 22-47	10 24-47

TABLE A—CONTINUED.

		Potatoes.—Seed large and whole.			Potatoes.—Seed medium size.			Potatoes.—Seed small.		
Potatoes.	Year	1869.			1869.			1869.		
	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Bushels of product per acre,	....	191 41-56	....	....	239 24-56	....	....	275 52-56	....
	Year	1870.			1870.			1870.		
	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Bushels of product per acre,	144 10-56	73 26-56	169 1-56	124 20-56	82 48-56	149 8-56	91 24-56	66 37-56	115 24-56
		Potatoes.—Seed cut.			Potatoes taking the place of corn in the rotation of crops.			Potatoes continued year after year on the same plots.		
Potatoes.	Year	1869.			1869.			1869.		
	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Bushels of product per acre,	....	186 23-56	....	....	259 16-56	....	....	178	....
	Year	1870.			1870.			1870.		
	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.
	Bushels of product per acre,	127 2-56	84 27-56	154 35-56	117 8-56	86 24-56	143 24-56	137 48-56	75 32-56	193

TABLE B.—*Containing an analysis of the foregoing Synopsis so far as relates to the results of experiments in testing the relative merits of fertilizers.*

			Product per acre of the ranges of plots limed.			Product per acre of the ranges of plots not limed.			Product per acre of the ranges of plots manured with commercial fertilizer.			Product per acre of the ranges of plots manured with barn-yard manure.			Product per acre of the ranges of plots with no manure.		
FIRST TIER.	Corn.	Year	1869.			1869.			1869.			1869.			1869.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of corn, ears	....	120⅛	88⅛	....	124⅓	66	....	111⅜	....	....	106⅓	....	....	100⅔	....
	Barley.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	Oats. E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of grain	20⅞	21¼	12¾	18¾	21⅛	7⅜	49⅛	50⅛	16⅛	50	47⅓	13⅝	43⅝	42½	13
FIFTH TIER.	Corn.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of corn, ears	113⅓	109⅓	156½	....	113⅛	70½	119⅞	109	87⅜	127½	121½	92⅓	113⅝	102⅞	70⅞
SECOND TIER.	Barley.	Year	1869.			1869.			1869.			1869.			1869.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of grain	....	30⅛	11⅜	....	31¾	....	....	31½	....	....	33⅞	....	....	27¼	....
	Wheat.	Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of grain	....	11⅛	17⅞	....	11⅓	....	....	3⅜	....	....	2⅔	....	....	3⅛	....

TABLE B—CONTINUED.

			Product per acre of the ranges of plots manured with commercial fertilizers.			Product per acre of the ranges of plots manured with barn-yard manure.			Product per acre of the ranges of plots with no manure.		
THIRD TIER.	Clover and timothy.	Year	1869.			1869.			1869.		
		Name of farm............	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Tons of hay...............	....	2 1840-2000	....	....	....	....	....	1 1840-2000	....
		Year........................	1870.			1870.			1870.		
		Name of farm............	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Tons of hay	....	2 1700-2000	....	....	3 320-2000	....	....	2 1200 2000	....
			Product per acre of potato plots with artificial fertilizers.			Produce per acre of potato plots with barn-yard manure.			Produce per acre of potato plots with no manure.		
THIRD TIER OF PLOTS.	Potatoes.	Year	1869.			1869.			1869.		
		Name of farm............	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of produce....	....	....	....	....	....	....	....	....	....
		Year	1870.			1870.			1870.		
		Name of farm............	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Pounds of produce....	159 1-56	134 16-56	83 18-56	211 8-56	188 32-56	83 24-56	131 8-56	120	64 24-56

TABLE C.—*Containing an analysis of the foregoing Synopsis so far as relates to the relative merits of the different varieties of grain, seeds and vegetables.*

			Product per acre of the Excelsior oats.—Plot 501, of '69—510 of '70.			Average product per acre of the W. Poland oats. Plot 511, of 1870.			Prod't per acre of the W. Schoenen oats.—Plot 503, of '69—512, of '70.			Product per acre of the Somerset oats.—Plot 505, of '69—513, of '70.			Product per acre of the remaining 9 new varieties of oats of the programme.		
Year			1869.			1869.			1869.			1869.			1869.		
SIXTH TIER.	Oats.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of grain	....	63¼	....	....	....	....	....	68⅜	....	....	54⅞	....	....	....	....
		Year	1870.			1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of grain	52	50½	26⅞	47¾	49⅝	28½	45⅜	54¾	21⅝	45⅜	40½	22⅜	53½	44	17½

			Product per acre of the Saxonian b'ley.—Plot 502, of '69—524, of '70.			Product per acre of Probstier b'ley.—Plot 504, of '69—523, of '70.			Product per acre of the common 4-rowed barley.—Plot 525, of 1870.			Product per acre of the remaining 4 new varieties of barley of the programme.		
Year			1869.			1869.			1869.					
SIXTH TIER.	Barley.	Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.			
		Bushels of grain	....	32⅛	....	....	28⅞	....	....	....	....			
		Year	1870.			1870.			1870.			1870.		
		Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.
		Bushels of grain	14¾	10⅛	12½	10⅞	12	....	21½	20⅞	10⅜	13⅜	15[illegible]	....

TABLE D.—*Containing a General Analysis of the foregoing Synopsis.*

	Product per acre of all the corn plots of the progr'me prescribed, in ears.			Product per acre of all the barley plots of the progr'me prescribed.			Product per acre of all the oats plots of the progr'me prescribed.			Product per acre of all the wheat plots of the progr'me prescribed.			Product per acre of all the potato plots of the programme prescribed.			
Year	1869.			1869.			1869.			1869.			1869.			
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	Bush. potatoes.	E.	C.	W.
Number of plots	....	28	22	....	25	21	....	7	2	....	....	....		......	6	3
Bushels of grain	....	112¾	73⅛	....	31⅓	10½	....	66⅛	45⅛	....	....	....		......	191½	206¼
Year	1870.			1870.			1870.			1870.			1870.			
Name of farm	E.	C.	W.	E.	C.	W.	E.	C.	W.	E.	C.	W.	Bush. potatoes.	E.	C.	W.
Number of plots	36	38	38	24	28	24	26	29	23	....	37	23		8¾	14	11¾
Bushels of grain	115½	108⅛	105⅞	18⅛	20⅝	10½	50½	47½	13¼	....	9¾	19⅞		150⅞	91⅞	122⅞

	Product per acre of all the clover and timothy plots of the programme prescribed.		
Year	1869.		
Name of farm	E.	C.	W.
Number of plots	....	3	....
Tons of hay	....	2 1653-2000	....
Year	1870.		
Name of farm	E.	C.	W.
Number of plots	....	14	....
Tons of hay	....	2 1851-2000	....

Moses Thompson, Treasurer, *in account with the Agricultural College of Pennsylvania, from September* 1, 1869, *to September* 1, 1870.

Dr.

To amount on hand September 1, 1869		$3,254 07
To cash received of Dr. T. H. Burrowes, from September 1, 1869, to September 1, 1870, viz:		
On tuition account	$5,487 00	
On room rent account	276 88	
On farm products account	746 73	
		6,510 61
To drafts received of General J. M. Campbell, from September 1, 1869, to September 1, 1870:		
Land scrip interest, January 4, 1870	$4,517 10	
Do......do... February 7, 1870	7,665 00	
Do......do... July 6, 1870	4,205 25	
Do......do... August 8, 1870	7,791 00	
		24,178 35
		33,943 03

Cr.

By Dr. Thos. H. Burrowes' orders paid, from September 1, 1869, to September 1, 1870	$28,534 22	
By amount paid E. C. Humes, interest	611 72	
Do....do..James Kelly....do	630 00	
By tax on loans for 1869	273 48	
By draft to pay college coupons, Sept. 25, 1869	2,814 00	
By James P. Carter's draft and interest paid	514 66	
By balance in treasury, September 1, 1870	564 95	
		$33,943 03
To balance in treasury, September 1, 1870		$564 95

MOSES THOMPSON, *Treasurer.*

Approved:

A. BOYD HAMILTON,
FRANCIS JORDAN,
Auditors.

THE AGRICULTURE OF PENNSYLVANIA.

This compilation comprises the progress of the industrial wealth of our State, according to the returns presented by the census, taken in 1870, 1860, 1850. It will be observed that the *decrease* in the value of silk, honey, sugar, and of a greater interest, Cheese, is enormous, while the *increase* on all other products of the soil is very striking.

	1870.	1860.	1850.
Acres of improved land	11,515,965	10,463,366	8,628,619
Acres of wood land	5,740,864	6,548,847	6,294,728
Acres of other unimproved land in farms	787,371	....	....
Value of farms	$1,043,481,582	$662,050,707	$407,876,099
Value of farming implements and machinery	35,658,196	22,442,842	14,722,541
Number of horses	460,339	327,654	350,398
Number of milch cows	706,437	673,547	530,224
Number of working oxen	30,048	60,371	61,527
Number of sheep	1,794,301	1,631,540	1,822,357
Number of swine	867,548	1,031,266	1,040,366
Value of all live stock	$115,647,075	$69,672,726	$41,500,053
Wheat, bushels	19,672,967	13,045,231	15,367,691
Rye, bushels	3,577,641	5,474,792	4,805,160
Indian corn, bushels	34,702,006	28,196,821	19,835,214
Oats, bushels	36,478,585	27,387,149	21,538,156
Barley, bushels	529,562	530,716	165,584
Buckwheat, bushels	2,532,173	5,572,026	2,193,692
Hay, tons	2,848,219	2,245,420	1,842,970
Clover seed, bushels	200,679	274,363	125,030
Grass seed, bushels	50,642	57,204	53,913
Hops, pounds	90,688	41,576	22,088
Hemp, tons	571	4,003	44
Flax, pounds	815,906	810,030	530,307
Flax seed, bushels	15,624	24,209	41,728
*Maple sugar, pounds	1,545,917	2,768,965	2,326,525
Beeswax, pounds	27,033	52,570	....
Honey	796,989	1,402,128	839,509
Tobacco, pounds	3,467.539	3,181,586	912,651
Wool, pounds	6,561,722	4,752,523	4,481,570
Potatoes, Irish, bushels	12,889,367	11,687,468	5,980,732
Sweet potatoes	131,572	103,190	52,172
Butter, pounds	60,834,644	58,653,511	39,878,418
Cheese, pounds	1,145,209	2,508,556	2,505,034
Milk sold, gallons	14,411,729	....	....
Value of orchard products	$4,208,094	$1,479,938	$723,389
Wine, gallons	97,165	38,623	25,090
Value of produce of market gardens	$1,810,016	$1,384,970	$688,714
Value of forest products	2,570,370	....	....
Value of animals slaughtered	28,412,903	$13,399,378	$8,219,848
Silk, cocoons, pounds	1	163	285

* This is caused by destroying the trees that the soil may be used for pasture, grain or fruit product.

REPORT

OF THE

Pennsylvania Fruit Growers Society.

PREPARED BY ITS OFFICERS.

1870-71.

CONSTITUTION.

ARTICLE 1. This association shall be entitled "*The Pennsylvania Fruit Growers Society*," and its objects shall be the advancement of the science of pomology and the art of fruit culture generally.

ARTICLE 2. Any person may become a member of this society by a vote of a majority of the members present at any meeting, and by paying into the treasury the sum of one dollar annually; or the payment of one dollar to the treasurer at any time shall constitute membership and entitle said member to a copy of the proceedings. The payment of ten dollars at one time will constitute a life membership.

ARTICLE 3. Its officers shall consist of a President, three Vice Presidents, a Recording and Corresponding Secretary and a Treasurer, all of whom shall be elected annually by ballot.

ARTICLE 4. The following standing committees shall be appointed: A Committee of five on Nomenclature; a Committee of three on Insects, of whom the Professor of Entomology shall be chairman; an Executive Committee, consisting of the President, Recording Secretary and Treasurer; and a General Fruit Committee, consisting of one member from each county represented, with a general chairman of the whole; each member of the Local Fruit Committee to have the privilege of appointing two assistants.

ARTICLE 5. The society may at any time elect honorary members.

ARTICLE 6. The society may from time to time appoint Professors on Entomology, Botany, Horticultural Chemistry and Geology.

ARTICLE 7. This constitution may be altered or amended by a vote of two-thirds of the members present at any regular meeting, notice of the proposed amendment, in writing, having been previously given.

ARTICLE 8. Seven members shall constitute a quorum for the transaction of business.

BY-LAWS.

ARTICLE 1. The Committee on Nomenclature shall collate and decide the standard and synonymous names of all fruits known in the society, with the authorities for each, and report, so far as practicable, at each regular meeting, and record the same in a book kept for that purpose.

ARTICLE 2. The General Fruit Committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual or semi-annual report. Also, that the said county committees shall form *ad interim* committees for their respective counties; and further, that said *ad interim* committees are hereby authorized to publish their reports in the "*Gardeners' Monthly*," or such other papers as they may select, the same having been first submitted to the chairman of the General Fruit Committee for his approval: *Provided*, That said publication shall be free of expense to the society.

ARTICLE 3. The annual meeting of the society shall be held on the third Wednesday of each year, at such place as the Executive Committee may appoint, at which time the election for officers shall take place; said officers to serve from the close of the meeting at which they are elected to the close of the succeeding annual meeting, at which time an exhibition and discussion of fruits shall take place, and other business transacted in the following order:

1st. Reading of minutes of previous meeting.
2d. Roll called and dues collected.
3d. Election of officers.
4th. Reports of officers.
5th. Reports of standing committees.
6th. Reports of special committees.
7th. Unfinished business of former meeting.
8th. New business.

The nomination and election of new members shall be in order at any time during the session.

ARTICLE 4. Other meetings may be convened by the Executive Committee at such time and place as they may appoint.

ARTICLE 5. No member who is in arrears for dues shall be eligible for any office, or serve on any standing committee; and any member who shall neglect to pay his dues shall cease to enjoy the privilege of membership.

STANDING COMMITTEES FOR 1871.

GENERAL FRUIT COMMITTEE.

E. Satterthwait, Montgomery county, Chairman.
J. E. Mitchell, Philadelphia.
Chas. Kessler, Berks county.
Thos. M. Harvey, Chester county.
A. Bombaugh, Dauphin county.
Dr. J. L. Suesserott, Franklin county.
L. S. Reist, Lancaster county.
S. W. Sharp, Cumberland county.
J. W. Rice, Perry county.
F. F. Merceron, Columbia county.
S. B. Heiges, York county.
W. M. Pannebaker, Mifflin county.
W. S. Bissell, Allegheny county.
B. Morris Ellis, Lycoming county.

ON NOMENCLATURE.

Josiah Hoopes, Chairman,
A. W. Harrison,
Thos. Meehan.
Thos. M. Harvey,
Sam'l W. Noble,

ON PUBLICATION.

Alexander Harris, Chairman,
Hiram Engle.
E. Satterthwait,

ON INSECTS.

Prof. S. S. Rathvon, Chairman,
R. B. Haines.
J. J. Stauffer,

ON WINES.

Robert Otto, Chairman,
John Fehr,
J. E. Mitchell,
Dr. J. L. Suesserott.

ON ARRANGEMENT AND RECEPTION.

J. E. Mitchell, Chairman,
A. W. Harrison,
D. W. Herstine.
Wm. Hacker,
Dr. J. S. Houghton,

LIFE MEMBERS.

Bissell, W. S., Pittsburg.
Brinton, W. P., Christiana, Lancaster co., Pa.
Calder, Rev. James, Agricultural College.
Cornelius, Robert, Philadelphia.
Engle, Henry M., Marietta, Lancaster co., Pa.
Engle, Hiram, Marietta, Lancaster co., Pa.
Ellis, B. Morris, Hughesville, Lycoming county, Pa.
Hayes, Charles P., Philadelphia.
Hildrup, W. T., Harrisburg.
Hoopes, Josiah, West Chester.
Knox, Jeremiah, Pittsburg.

HONORARY MEMBERS.

Downing. Charles, Newberg, N. Y.
Meehan, Thomas, Germantown, Pa.
Michener, Dr. E., Avondale, Chester co., Pa.
Rathvon, S. S., Lancaster. Pa.
Rowe, Hon. A. Watson, Chambersburg.
Saunders, Wm., Washington, D. C.
Stauffer, Jacob S., Lancaster, Pa.
Thomas, John J., Union Springs, N. Y.
Warder, Dr. J. S., Cincinnati, O.

ANNUAL MEMBERS.

Achelis, George, West Chester, Pa.
Andrews, Thomas C., Moorestown, N. J.
Allenboch, John S.
Atlee, Wm. Augustus, Lancaster, Pa.
Black, James, Lancaster, Pa.
Bachman, Jas., Strasburg, Lancaster county, Pa.
Breckbill, J. H., Strasburg, Lancaster co.
Breckbill, Elias, Strasburg, Lancaster co.
Brinton, Moses, Christiana, Lancaster co.
Brinton, S. L., West Chester, Pa.
Bombaugh, Aaron, Harrisburg, Pa.
Black, S. Wilson, Harrisburg.
Bernheisel, Solomon, Green Park, Perry county. Pa.
Brinkle, W. G. P., Philadelphia.
Conard, S. F., West Grove, Chester county, Pa.
Cocklin, Jacob, Shepardstown, Cumberland county, Pa.
Cocklin, Eby H., Shepardstown, Cumberland county, Pa.
Crucknell, Charles, Harrisburg, Pa.
Davis, Edward M., Philadelphia.
Deitz, G. A., Chambersburg, Franklin co.
Dreer, H. A., Philadelphia.
Duey, Simon, Harrisburg, Pa.
Diffenderfer, W. L., New Holland, Lancaster county, Pa.
Engle, E. B., Chambersburg, Pa.
Engle, J. G., Marietta, Lancaster co., Pa.,
Engle, Edward J., York, Pa.
Eckert, Isaac, Reading, Berks co., Pa.
Eby, J. R., Harrisburg, Pa.
Fraker, F. A., Shirleysburg, Huntingdon county, Pa.
Fisher, Gen. J. W., Lancaster, Pa.
Frantz, M. A., Harrisburg, Pa.
Fehr, John, Reading, Pa.
Fuller, Andrew S., Ridgewood, Bergen co., N. J.
Garber, Jacob B., Columbia, Lancaster co.
Guarrigues, Thomas, Kingsessing, Phila.
Guthrie, Allen, Lancaster, Pa.
Guthrie, W. D., Chambersburg, Pa.
Grabill, S. E., Strasburg, Lancaster county, Pa.
Gross, D. W., Harrisburg, Pa.
Gray, John N., Harrisburg, Pa.
Hamilton, A. B., Harrisburg, Pa.
Hacker, William, Philadelphia.
Haines, R. B., Cheltenham, Montgomery county, Pa.
Heise, H. H., Columbia, Lancaster county, Pa.
Helwig, Solomon.
Hill, Dr. George, Hughesville, Lycoming county, Pa.
Harrison, A. W., Philadelphia, Pa.
Harvey, Thomas M., West Grove, Chester county, Pa.
Hiller, Casper, Conestoga, Lancaster co.
Hoopes, Abner, West Chester, Pa.
Helges, S. B., York, Pa.
Hershey, J. H., East Hempfield, Lancaster county, Pa.
Herstine, D. W., Philadelphia.
Hagar, H. W., Lancaster, Pa.

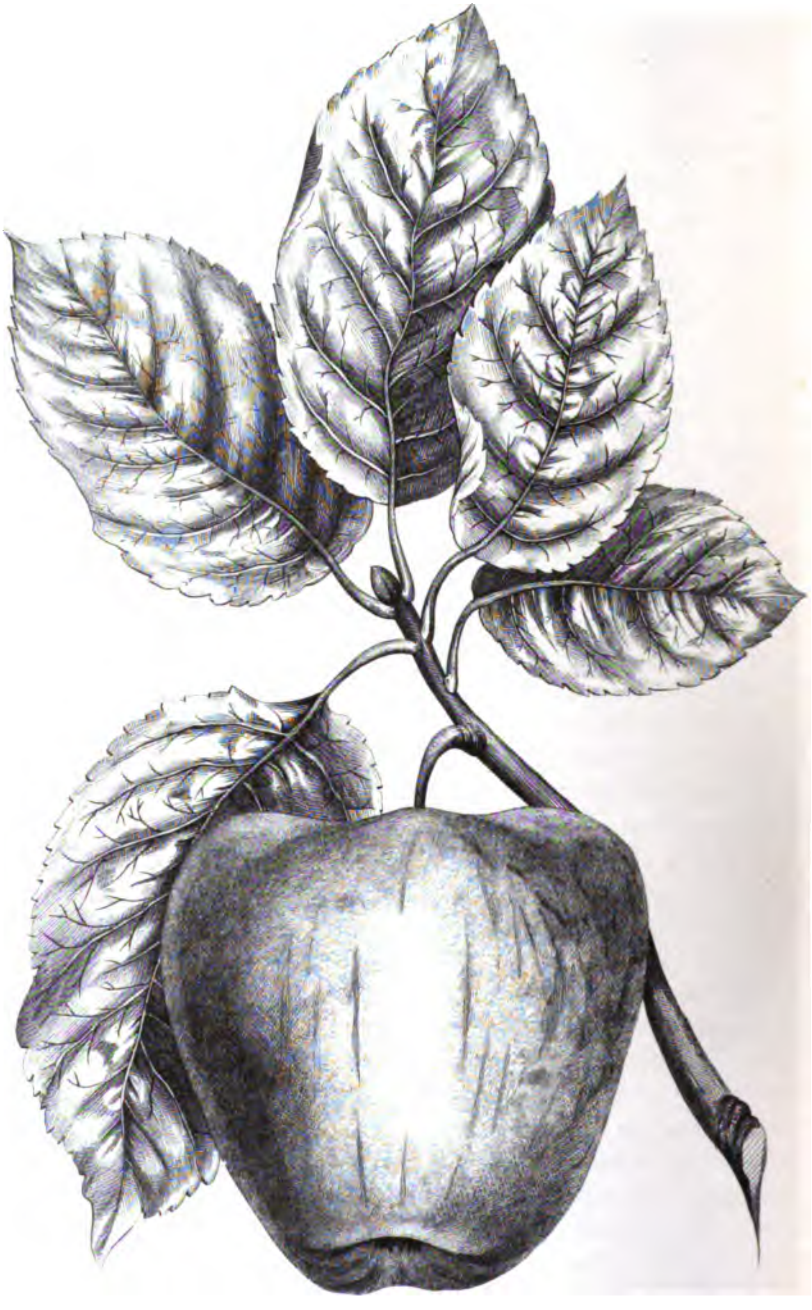
Hershey, H. H., Christiana, Lancaster co.
Herr, Cyrus N., Strasburg, Lancaster co.
Hensel, Geo. W., Quarryville, Lancaster county, Pa.
Holstein, W. H., Bridgeport, Montgomery county, Pa.
Jenkins, T. B., Greencastle, Franklin co.
Koser, I., Newville, Cumberland co., Pa.
Kiner, A. W., Shippensburg, Cumberland county, Pa.
Kauffman, A. J., Columbia, Lancaster co.
Kessler, Charles, Reading, Berks co., Pa.
Kepple, John, Harrisburg, Pa.
Kendig, M. D., Manor, Lancaster co., Pa.
Lingle, John L., Harrisburg, Pa.
Livingston, J. B., Lancaster, Pa.
Landis, B. L., Landis Valley, Lancaster county, Pa.
Landis, Israel L., Lancaster, Pa.
Linn, John, Chambersburg, Franklin co.
Mehaffey, G. W., Marietta, Lancaster co.
M'Millan, C. C., Gettysburg, Adams co.
Merceron, F. F., Catawissa, Columbia co.
Miller, B. C., Lancaster, Pa.
Mitchell, J. E., Philadelphia.
Musser, John, Marietta, Lancaster co., Pa.
Musser, J. H., Marietta, Lancaster co., Pa.
Martin, Tobias, Mercersburg, Franklin co.
Mumma, David, Harrisburg, Pa.
Murdoch, John, Pittsburg, Pa.
Noble, Samuel W., Jenkintown, Montgomery county, Pa.
Otto, Robert, West Chester, Pa.
Parker, J. T., Mercersburg, Franklin co.
Parry, Wm., Cinaminson, New Jersey.
Pypher, Wm. L., Lancaster county, Pa.
Pyle, Josiah W., Willow Dale, Chester co.
Parfle, S. H., Columbia, Lancaster co., Pa.
Reist, Peter S., Oregon, Lancaster co., Pa.
Reist, Levi S., Oregon, Lancaster co., Pa.
Reed, W. G., Chambersburg, Franklin co.
Rife, Israel, Hagerstown, Md.
Russell, John N., Fulton, Lancaster co.
Riley, Peter, Lancaster, Pa.
Rupp, H. S., Shiremanstown, Cumberland county, Pa.
Reynolds, S. H., Lancaster, Pa.
Rohrer, Adam, Lancaster county.
Ryder, B. D., London, Franklin Co., Pa.
Satterthwait, Edwin, Jenkintown, Montgomery county, Pa.
Shafer, W. L., Philadelphia.
Shope, C.
Small, Geo. H., Harrisburg, Pa.
Strickler, M. M., Columbia, Lancaster co.
Steinman, A. G., Lancaster, Pa.
Shoch, Samuel, Columbia, Lancaster co.
Stouffer, Amos, Chambersburg, Franklin county, Pa.
Suesserot, J. L., Chambersburg, Franklin county, Pa.
Stouffer, John, Chambersburg, Franklin county, Pa.
Sharp, S. W., Newville, Cumberland co.
Stoner, H. K., Lancaster, Pa.
Sprout, A. R., Picture Rocks, Lycoming co.
Shaffner, Jacob, Harrisburg, Pa.
Smiley, John K., Jackson Hall, Pa.
Stube, Henry, Hagerstown, Md.
Thomas, G. B., West Chester, Pa.
Taylor, Dr. Franklin, West Chester, Pa.
Thomas, Wm., Lancaster, Pa.
Woods, T. A., Paradise, Lancaster co., Pa.
Weiser, B. H., York, Pa.
Willets, Rev. John, Philadelphia.
Williams, Joseph S., Cinaminson, N. J.
Williams, Henry T., New York.
Wickersham, Jos. W., Yocumtown, York county, Pa.
Weaver, Reuben, Mastersonville, Lancaster county, Pa.

DESCRIPTION OF PLATES.

Fig. 1. *Cornell's Fancy Apple.*—Originated about seventy years ago on the farm of Gilliam Cornell, in Southampton township, Bucks county, Pa. It has been so thoroughly tested in that vicinity, and has proven so valuable, that orchardists should feel no hesitancy in adding it to their collections in other places. The tree is vigorous and healthy, an upright and rather spreading grower; productive and a regular bearer, making a handsome tree both in the nursery and orchard, with large leaves slightly recurved. Fruit—medium, oblong, conical; color, waxen yellow, shaded and splashed with crimson; stalk of medium length, cavity rather large; calyx, closed, abrupt, corrugated; flesh, white, tender, crisp, juicy with a pleasant sub-acid flavor; core, medium or large; very good.

Fig. 2. *Rutter Pear.*—This excellent variety originated with John Rutter, Esq., of West Chester, Pa., who kindly furnished us the following history: "The Rutter Pear, as it was christened in name some years ago by our friend Jonathan C. Baldwin, Esq., then President of the Chester County Horticultural Society, and described in the *Pennsylvania Farm Journal* as 'Rutter's Seedless,' was produced from a seed of the 'Van Mons Leon le Clerc,' crossed no doubt with some other variety, as the tree was planted and grew within a few yards of an 'Easter Beurre,' 'Dearborn's Seedling,' 'Bloodgood,' 'Seckel,' and some twenty other varieties more distant in the same inclosure—all fruiting trees. If I were to venture an opinion on this point, I should be inclined to pronounce it a cross with the 'Easter Beurre,' from its form, size, color, and general appearance, giving this old 'Winter King,' the credit of sharing equally at least with the Van Mons in the cross fertilization.

"The first product from this tree was a single pear—a fine specimen—from which I obtained two seeds; these were planted in a flower pot and placed in a green house in the autumn, and by gardening time the following spring, I had two fine strong plants which I turned out into a flower bed in the garden, where they continued to grow—one of them soon giving unmistakable evidence of its parentage by exhibiting the rough creased bark so much in character with the old Van Mons Leon le Clerc; the other (Rutter) was upright, clean, and thrifty, making three-fold the growth of its twin companion, and on the fifth or sixth year of its age, produced fruit, but which to my great disappointment was tested by some depredating boys before maturity; and what was more provoking, these *young amateurs* continued their predatory visits for some two years longer, gathering on each visit the whole crop.



SWEET QUINCE.

B. Singerly Lith. Pittsb.

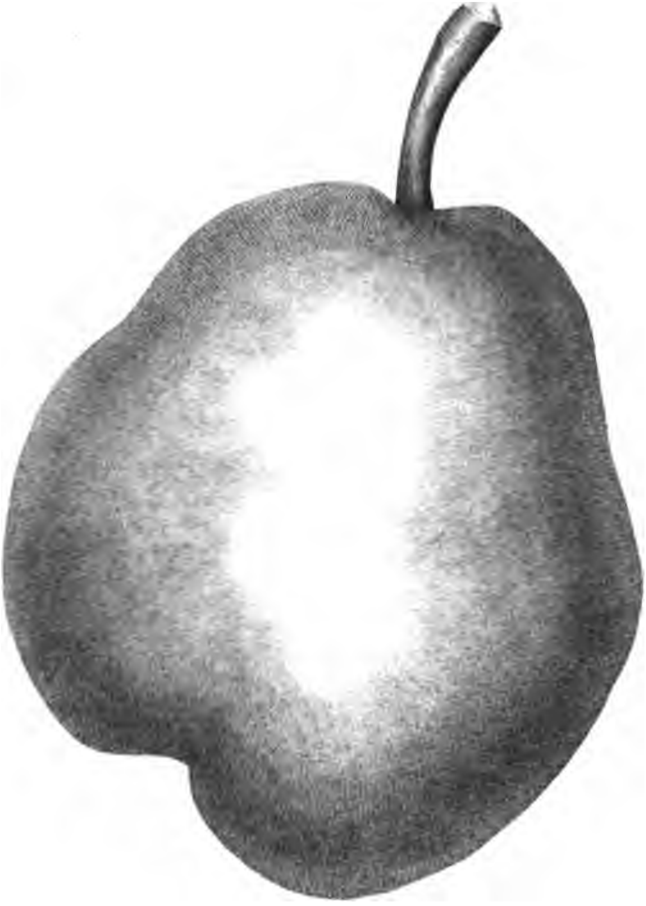


FIG. [illegible]

[illegible]

B. Sinferly Lith. Pittsb.

"The tree was then removed to my present residence, where it is now growing and producing heavy crops every year. For six or eight years of first fruiting it produced entirely *seedless* fruit, some specimens showing scarcely any traces of even a core, and rarely a specimen showing an abortive seed. After this time an occasional specimen was found with one or two seeds. This change has gone on increasing until almost every pear now produces more or less perfect seed. The tree is an upright, symmetrical grower, with light colored bark, and an early and constant bearer. Fruit large, roundish-obovate green, changing to yellowish-green at full maturity; flesh fine-grained, melting, almost dissolving into a rich, vinous-flavored juice. The fruit is gathered from the original tree generally about the 20th of October, ripening off in the fruit-room, in the ordinary temperature of the season, in from four to six weeks. As the quality of this seedling is now pretty well known, I believe, among amateurs and nurserymen, who no doubt will speak of it as it deserves, I will not, therefore, at this late day, express any opinion of my own on its merits, or compare it with the popular pears of its season, for in this respect I think it *sin generis*." Although this estimable variety has been in existence about twenty years, its merits are scarcely known beyond the neighborhood of its origin, and yet scores of inferior kinds have in the meantime enjoyed their brief period of popularity.

Fig. 3. *Sweet Quince.*—Introduced to notice during the past year by T. B. Jenkins, of Chambersburg, Pa., where it originated some forty years since. The cut is below the usual size of the fruit, and therefore does not do it justice. The tree is an abundant bearer and good grower. Fruit of medium size, oblate, somewhat ribbed; color, rich, golden yellow; stem set in a broad, dull brown, rough, knob-like projection; whilst the calyx has large, long segments set in a deep basin; flesh, deep yellow, coarse-grained, not very juicy, a little rough and of a mild, sub-acid character.

PROCEEDINGS, 1871.

The Pennsylvania Fruit Growers Society met in Repository Hall, in Chambersburg, Franklin county, on Wednesday evening at seven o'clock, Josiah Hoopes in the chair, and Alexander Harris, Secretary.

The reading of the minutes of the last meeting was dispensed with, and the Secretary proceeded to call the roll of members.

Upon motion, the following gentlemen were elected members of the society:

Honorary Members.—Judge D. Watson Rowe, Greencastle; T. B. Jenkins, Chambersburg.

Acting Members.—M. D. Kendig, Lancaster county; B. C. Miller, Lancaster county; Adam Rohrer, Lancaster county; C. C. M'Millan, Gettysburg; Dr. Franklin Taylor, West Chester; G. B. Thomas, West Chester; F. A. Fraker, Huntingdon county; H. H. Heise, Columbia.

Dr. J. L. Suesserott introduced Judge Rowe to the society, who, in a short speech, tendered the members of the society, on behalf of the citizens of Chambersburg, a most hearty welcome, and wished them, one and all, success in their noble enterprise of building up the science of pomology and general fruit culture.

President Hoopes replied in a few well-timed remarks, and next proceeded to deliver the annual address to the society.

PRESIDENT'S ANNUAL ADDRESS, DELIVERED AT CHAMBERSBURG, PA., JANUARY 18, 1871.

Again, gentlemen of the Pennsylvania Fruit Growers Society, it becomes my very pleasant task to address you on topics so intimately connected with our every-day duties, so interwoven with all our pleasures and pursuits; indeed, so necessary for the true enjoyment of a rural life, that their discussion in these annual gatherings are in reality not unessential to insure success. I know well that there are those who, taking a selfish view of the subject, are inclined to believe societies gotten up for the advancement of fruit culture of little use. Forgetting entirely the social character of our meetings, they prefer to labor on, solitary and alone, depending solely upon facts which they sparingly glean from personal experience. But there are those again, looking beyond this narrow-minded policy, who annually gather knowledge from the rich field offered by the many that have tested the various theories of the day, and are ready to impart unto others the information so gained; and there are those, too, with us here to-day, ready, as in the past, to aid with unselfish motives all who stand in need of counsel and advice.

In my remarks this evening, I desire first to call your attention to the importance of fruit growing in our own State, its profits and adaptability to our soils; and then offer a few suggestions for the improvement of our society.

Pennsylvania, with her large area of territory, diversified by every conceivable advantage of mountain, valley and plain, with a climate so varied in general character, and with soils of almost every description, must certainly form a fruit growing State of no mean importance. Then, again, the comparative short distance to the best markets in the country, and the unsurpassed facilities for forwarding quickly and cheaply the products of our orchards and gardens to their destination, are favorable features to be taken into account. Of late, numerous reports have been circulated to the effect that we cannot any longer grow good fruit in this State, nor can it be made remunerative—but I think very differently. Indeed, so persistent has been the attacks of our opponents, and so very plausible their arguments, that many well-intentioned cultivators (among whom I am very sorry to be obliged to class a few old and valued members of this society) have been ready to believe these silly croakers. The great object that every fruit grower has constantly in view, is that of profit. Whether for home consumption or for market, it matters not, this one consideration is held paramount over all others.

We are all more or less selfish naturally, and no persuasion or influence can exclude this view of the subject. We may preach the delights of fresh fruits plucked from the tree of our own planting, or of the superior qualities of a certain variety which is unfortunately a shy bearer, but after all, if *they do not pay*, we purchase our fruits from those who make it remunerative, and root out the delicately flavored kind, so that we may plant in its place one of second rate quality, but uniformly productive. Such is human nature the world over, and I am sometimes of the opinion that it is not so very far wrong either. Which of you owning a light sandy soil, would plant the Triomphe de Gand strawberry, and be satisfied with the meagre, although delicious crop of fruit; and who would of choice set out a large orchard of Susquehanna peaches, beyond the narrow limits of its place of nativity, and yet it is large, beautiful and delicious; or indeed is there any one owning a clay soil who would think of growing peaches for profit? These things regulate themselves, and all that is required is sufficient knowledge to guard against errors in cultivation, and sufficient information as to what we should plant. Good fruit is as profitable to-day as ever it was; yes, every day enhances its value, as the taste of the consumers in our large cities becomes cultivated. Demand will regulate the supply, and the former is annually increasing. This cannot well be controverted. Such being the case, the first question of importance with us is, can we meet this demand on our own soils, so as to prove remunerative. To this I unhesitatingly answer, yes; provided the producer understands practically the various impediments which are constantly in the way of our cultivators. These impediments, principally of recent introduction, can be overcome, however, to a great extent, and I am one who believes firmly, that as good fruit can be grown now as our fathers produced in past generations.

Through the kindness of a few of the leading fruit growers of our State, I am enabled to lay before you some interesting statistics in regard to the profits of Pennsylvania fruit culture, showing the matter in its true light by actual facts and figures. I desire to state in advance, that the statements furnished me were in almost every instance obtained under protest, and that the writers' names might be withheld for fear of being deemed egotistical and boastful, but I think I may safely assure them that my audience will not so construe their kindness.

The cultivation of small fruits with us is necessarily accompanied with considerable expense, owing in a great measure to the character of our soils, which are remarkably adapted to the growth of weeds; but I always regard weeds as blessings in disguise, to teach men lessons of cleanliness and thorough cultivation. What we lose by extra expense in labor, we certainly gain in the size and beauty of our fruit, and this is decidedly an important auxillary. Strawberries, in my native county of Chester, pay well in the majority of seasons. We are near a good market, and quick transportation speedily delivers them to the consumers, fresh and handsome.

A successful strawberry grower for the West Chester markets, reports his experience with that variable variety, the Triomphe de Gand, as follows: "In the spring of 1864 I planted 4,800 Triomphe de Gand on ground previously planted with potatoes, which were but slightly manured, the ground receiving nothing whatever when planted to strawberries. They were set two and a-half by one foot apart, and all runners kept off, and worked by a horse. In the year 1865 I sold 778 quarts for $174 73.

"After the crop was gathered the bed was merely cleansed from weeds, and running the year 1866 again without manure, yielding 437 quarts, selling for $151 44; the latter year a very bad one for strawberries. I consider the care I gave them but ordinary, and am satisfied the yield would have been greater had I given proper attention. I believe had the quantity been large enough to have warranted shipping, I could easily have realized 50 cents per quart, as I have since wholesaled the same variety for 40 cents, with prices not so high as a general thing.

"You will observe the distance I plant will require 17,424 plants per acre;

we have therefore for 1865, 2,824 quarts, selling for $634 24; for 1866-1,586 quarts, selling for $549 72.

"I have since cultivated by the acre, and have had very good success—have never yet had sufficient to supply the demand. I consider the above statement as applying to field culture, and am sorry my time will not permit me to dissect my account so as to give my larger experience."

An extensive cultivator for the Philadelphia markets states that he sells strawberries annually to the amount of from $2,000 to $4,000, from about three acres; but as the cultivation is attended with considerable expense, he is of the opinion that good opportunities for disposing of the crop is a requisite to insure adequate remuneration. With *him* they are a paying crop. The same grower says, in regard to raspberries, that "they pay well, for although they do not yield as much per acre, they are less expensive to cultivate than strawberries." He furthermore remarks, "I have about two acres of raspberries, and they will average one year with another, about $500 per acre. Currants and gooseberries about the same." Other cultivators are in favor of the production of small fruits here, with reports of greater or less amount of net profit on the same. Any one who is at all acquainted with the extensive Knox plantations at Pittsburg, in this State, needs not to be told, that under the system of cultivation pursued there, small fruits are exceedingly profitable.

In the orchard, pears have generally been discouraged as about the poorest crop we could possibly grow; some entertain now a very different opinion, as the following extracts from a recent letter, written by a prominent Pennsylvanian pomologist, will show. He says, "It is about twelve years since I commenced planting pear trees, with a view of growing the fruit for market, and since that time I have set out near 5,000 trees. They are spread over near 30 acres, but in most of this ground, the rows of trees are wide apart, and all the ground is constantly occupied with other crops; the rows themselves being filled up between the trees with currants, gooseberries, raspberries, rhubarb, or other things, and for any thing that I can see, the ground has produced as much as if there had been no trees there.

"So that although I cannot base the cost of my orchard on this account, at much more than the original price of the trees and outlay for planting, the labor of which not being heavy, as I went to no extraordinary expense in preparing the ground. All the manuring my pears have ever had is the annual dressing I give the ground for the other crops. As I have generally had a fair crop of pears, and have always been able to obtain good prices, I consider them remunerative.

"I am not able to give any data excepting for the current year, and that without being very exact. At least 1,000 bushels have been disposed of during the present season, with a portion remaining unsold, the average price ranging about $2 per bushel. Owing to the extraordinary warm weather, all varieties ripened quite early, and even the best keepers had to be disposed of or they would have rotted. From this cause the price was considerably reduced."

One of the most productive pear orchards in this or any other State, is the celebrated collection of Tobias Martin, at Mercersburg, Pa., now ten years planted.

The cost of the land was $40 per acre, and the expense of preparing the same was $10 per acre more; this, with the additional cost of 400 trees to the acre, and planting the same, makes a total outlay of $150 per acre after the trees were set. The trees were planted 10 feet apart each way, alternate rows having alternate standards, making the standards 20 feet apart, with dwarfs between them in either direction.

For the first three years the orchard was devoted to the growing of potatoes, 2 rows between each row of trees, the average annual yield of which was $100 per acre. Afterward the ground was used for cabbage and tomatoes, with a much smaller yield, say $50 per acre.

During the fourth and fifth years the trees commenced bearing, and the product was $50 per acre. The sixth and seventh, $100 per acre, and the eighth, ninth and tenth years an average of $200 per acre.

The annual cost of labor and for fertilizers was $50 per acre. The above statement does not include the amount of fruit used, nor that given away, which was very liberal.

The following will give some little idea of the prices received for the fruit: Bartlett, extra fine, from $1 to $1 50 per doz.; Bartlett, first-class, extra fine, $4 per bushel; Bartlett, second class, $2 per bushel. Vicar of Winkfield, Lawrence and Easter Beurre, sold for $24 per barrel. Duchesse D'Angouleme and Beurre Claiyeau, (extra specimens,) from $3 to $5 per dozen.

The peach crop in Pennsylvania, until the past few years, was a decided failure, owing mainly to the prevalence of the dreaded "yellows;" fortunately, however, this has, in a great measure, passed away, and at the present time we are enabled to turn our attention to growing this fruit with profit. But in this connection I desire to impress upon fruit growers in this State, that as the climate of Delaware and Maryland is so well adapted to maturing the earlier varieties in advance of us, it is prudent in us to turn our attention to the later kinds, which we are capable of producing of unexcelled size and beauty. For instance the Crawford's Late, a magnificent peach, is perhaps as profitable with us, and will pay as large a percentage on the capital invested, as any fruit that can be grown. I know of one instance where the crop of this variety alone sold for $4 per bushel.

Taking into consideration the length of our seasons, late peaches will very generally succeed satisfactorily. One orchardist informs me he has disposed of $700 worth of peaches from one and three-fourth acres, mostly of the Smock variety, although the "rot" of the past year reduced the amount considerably. Another neighboring orchard, consisting of 1,000 trees, realized the sum of $900, and says the owner, "had all the varieties produced as well as did the Crawford's Late, it would have brought fourfold more."

All the larger fruits pay with varying success, depending greatly on the vicissitudes of a changeable climate. That apples will pay has been abundantly proven, if sufficient attention be given the trees. Insects have to be fought, and diseases counteracted, but success will surely follow a systematic course of careful culture.

One branch of pomological industry has not received that attention which its merits deserve. I allude to the forcing of fruits under glass. Many are deterred through ignorance in regard to the management of such structures, believing that they are at best but expensive luxuries, and calculated for amusement alone. That this view is fallacious I am enabled to prove, from a statement kindly furnished me by the owner of an extensive structure, designed wholly for profit. The statistics here offered were carefully compiled from an unimpeachable record, and therefore may be implicitly relied on. One of the buildings referred to consists of a "*lean to*" house, 100 feet long and 17 feet 4 inches wide, including a four-feet walk along the back. The rafters on the same are 16 feet long. The other structure is built in the "double pitch" style, on the north side of the former, and to which it is connected. The latter is 50 feet long and 20 feet wide, with 12 feet rafters. The whole range is heated by one of Myers's upright tubular boilers, using 800 feet of iron pipe that will hold one gallon of water to the foot. In addition to this heating apparatus, the smoke flue is carried along the whole length of the house, and a stove is placed in the extreme northern end, to be used only in excessively severe and windy weather. The original cost of these houses is not definitely known, but as they were erected during the late war, when material and labor was at the highest point, one may judge that it was very expensive. The heating apparatus was placed in working order at a cost of something over $700. The following is an extract from the statements of the owner:

"For two years I had no fruit; the third year I think about 150 pounds; the fourth year a nice crop of 800 pounds.

"No account has ever been preserved of the quantity used, but only what was sold; neither have I the amount produced by any single vine, with one exception; a large vine in the south house, (black Barbarosa, or a closely allied variety,) which has fruited four years, the product of this, however, has been carefully weighed each year, and is as follows, viz: The first two seasons, 49 pounds 15 ounces each year; the next 72 pounds, and the last, 49 pounds 8 ounces; but I am satisfied we have several black Hamburgs that have produced 40 pounds each, for the past three years. Bowood Muscats that produce regularly from 15 to 25, and perhaps 30 pounds. If I was obliged to have only three kinds of grapes in my houses, I should select the above named varieties from such as I have any knowledge. If there are any more profitable, I do not know them. Besides the above, we grow Golden Hamburg, Muscat Trouvernon, Grizzly Frontignac, &c.

"The Muscat Trouvernon is a very constant bearer, with handsome bunches, but does not equal the Bowood in character. So with the Golden Hamburg, it is very elegant, but the Bowood is still more beautiful; and here, is as reliable as the Black Hamburg.

"Another objection to the Golden Hamburg is, it must be cut as soon as ripe, and still another, it bears full crops only in alternate years; but I should not like to do without it, as it ripens several days earlier than the Bowood.

"The Grizzly Frontignac is not a popular market grape, the objection being to its color, which is neither white nor black; but on account of its earliness, a vine or two is no objection in a collection. We have discarded Mitchel's St. Peter's, and cut out fifteen or sixteen Muscat Hamburgs.

"There is no objection to the last named on account of flavor, but the manner in which it ripens is very vexatious."

These vineries commenced bearing full crops during the summer of 1868, when the amount sold was 1,078 pounds 12 ounces, and realized $1,367 44; the expenses for the season for coal, labor, marketing the fruit, incidentals, &c., was about $670, leaving a net profit for the year of nearly $700. The year 1869 produced a crop of 1,097 pounds 11 ounces, and sold for $1,147 20, at a net profit of $583 93.

The past year's profits was but about $367 86; these expenses included all repairs, and additions to the buildings, as well as commissions paid for disposing of the fruit, &c.

And now, gentlemen, with your permission, I will call your attention to a few ideas that occur to me in regard to the affairs of our association.

Among the prominent matters which I desire this society to investigate more thoroughly, is that of correct nomenclature. Early in the history of this association, the special committee on this subject endeavored to awaken an interest in their duties, and with a view to impart knowledge, caused to be published a "Formula of Description," embracing rules of guidance, whereby every one at all acquainted with fruits would be able to describe a new variety by a correct and improved method. No attention has been paid to the repeated requests of said committee, for descriptions or specimens of fruits, and yet far from being discouraged, they again request that members of this society, in the possession of any new seedling fruit of merit, that has originated in this State, will prepare a full description of the same, according to the "Formula," and forward it to me. The design of the committee on nomenclature is to prepare a work on native Pennsylvania fruits, and for the better accomplishment of their purpose, they desire to commence with the apple, give the authentic history of each, name of introducer, date of introduction, and all other important items in connection with it; and lastly, in an accurate and impartial manner, describe it fully. As colored drawings of each will also prove servicable, it is desired that such be made, and secured in a book kept for the purpose.

Having called your attention to the proposed object of the committee, I wish to make a few remarks on some points connected with pomological descriptions. Too little dependence is frequently placed on many characters, which really prove of exceeding value when properly employed. For instance, the blossoms of the apple often form a criterion by which we can name a particular variety. This peculiarity of variation is not alone restricted to either size, color, or season of expansion, but is noticeable in all, The Red Astrachan, Early Harvest, Belmont, Knowles, Summer Pearmain. Primate, and Bradford Beauty, bloom early; Jefferis, a Golden Russet. Baldwin, Yellow Bellefleur, Gravenstein, Rhode Island Greening, Smokehouse, and Smith's Cider, open their blossoms a few days thereafter; whilst the Maiden's Blush, Tewksbury Winter Blush, Rambo, Mother, Ladies' Sweeting, Ailes, Hays, Roman Stem, Swaar, and Newtown Pippin, blossom still later. After these we have a few varieties of unusual lateness, as for instance, Raule's Janet, Peck's Pleasant, and frequently Porter. The flowering season is not a reliable rule by which we can pre-judge of the fruiting season, and yet in the majority of instances, especially among our early kinds, it is certainly an indication.

In refering to my notes, I find such winter apples as Belmont, Bradford Beauty and Baldwin, blooming early; and summer varieties like Maiden's Blush and Porter, blooming late.

This latter class, as a rule, are more reliable for regular crops of fruit, as the late frosts of spring are avoided; hence the popularity of many of the varieties above mentioned.

The next point of importance in this blossom question is in regard to their relative size; and it is indeed wonderful how this apparently unimportant character has been overlooked. The Red Astrachan, Early Harvest, Belmont, Gravenstein, Rhode Island Greening, Bradford Beauty and Primate, are among the largest. Maiden's Blush, Smokehouse, Rambo, American Golden Russet, Codlin, Yellow Bellefleur, Hays, Summer Pearmain, Roxbury Russet, Swaar, Porter and Newtown Pippin, are of medium size;

two seasons, 49 pounds 15 ounces ea ... Mother, Ailes, Ladies' Sweeting,
last, 49 pounds 8 ounces; but
burgs that have produced ... is a comparison of the fruits and blos-
wood Muscats that prod ... Bradford Beauty, a small sized apple, is preceded by a very
If I was obliged to hav ... and such mediums to large fruit as Mother and Ailes, have very
select the above nam ... blossoms; yet, as was noticed in my remarks on the season, large
there are any more ... seasons, as a rule, are forerunners of large fruits, and *vice versa.* We now
grow Golden Ha ... arrive at the color, which, in the flower of the apple, is very distinct in the
"The Musca ... larger portion of our list of varieties, but as a criterion for judging of the
bunches, but ... skin of the fruit, it is comparatively worthless. The tints in the petals of
Hamburg, ... our cultivated apple blossoms are of every shade, from pure white to the
here, is a ... richest carmine rose. A few instances will best explain how unreliable are
"An ... the comparisons of color in the blossom and fruit of any variety. Pro-
ripe, ... ducing snow-white flowers, we have Red Astrachan, Summer Pearmain and
sho ... Newtown Pippin. Blossoms with very nearly pure white petals are Tewks-
Br ... bury Winter Blush, Rambo, Ladies' Sweeting, Gravenstein and Porter.
With pale pink or flesh-colored bloom are Jefferis, Maiden's Blush, Early
Harvest, American Golden Russet, Knowles and Roxbury Russet. With
rosy blush or light rose colored flowers, are Yellow Bellefleur, Rhode Island
Greening, Roman Stem, Bradford Beauty, Smith's Cider, Primate and
Swaar. Occasionally we find a variety with delicately veined blossoms, as
Smokehouse, Mother and Ailes, or prettily crimped on the edges, as Swaar.
A few varieties present an unusually handsome appearance, from the fact that the bud is of a rich, rosy crimson, whilst the expanded flower may be pink or pale rose, as is instanced in the Hays and Codlin. The Belmont, and to a certain extent the Baldwin, have their petals distinctly bordered with rosy red, and many others are partially so. I have been thus explicit for the purpose of inviting attention to a subject usually deemed of trivial importance by our authors on fruit, but which really merits our consideration. I might, however, add that many other kinds of fruits do not present such marked characters.

Taking for instance the pear, we find the blossoms of all the varieties uniformally white, with pretty violet colored anthers; but very distinct in size, length of peduncle, (or stem,) shape of petals, &c. In the period of expansion, we can also detect a variation, but not to so great an extent as in the apple. I might extend my remarks, and invite your attention to the tree itself—how very different the color of the bark—the arrangement of the branches—the general outline—or the size, shape and color of the leaves, but I think I have sufficiently explained my meaning, and I will therefore merely ask our members, generally, to procure a copy of our printed "Formula of Description," and by its aid, assist the committee in their work. During the past year, I assumed the responsibility of inviting a few memto act in the capacity of an *ad interim* committee, for the purpose of the strawberry crop of New Jersey, and report to the society at eting the result of their observations.

ave long thought that such a course would not only be interesting to r members, but useful also as a means of ascertaining what the pomologists of other sections are engaged in, and how their cultivation compares with that of our own. This committee, I may say, spent two days in an exceedingly pleasant manner, having received the greatest amount of courtesy and kindness at the hands of the New Jersey fruit growers, and will in due season report to you, in detail, a full account of their visit. If not inconsistent, therefore, with the views of this society, I would suggest that a like committee be again requested to visit, in a simlar manner, other sections of country; such, for instance, as the extensive peach districts of Delaware and Maryland, the blackberry plantations of New Jersey, or the larger orchards of our own State.

The published reports of proceedings of any society are, without doubt, a great incentive towards increasing our interest and enthusiasm in its behalf, and with this view I desire to state that some plan must necessarily be adopted to enable our association to issue such printed periodicals annually, and thus keep alive the interest in our work, as well as for the purpose of imparting instruction unto others who cannot meet with us. Owing to the scarcity of funds at our disposal, we have been unable for several years to issue a detailed account of our meetings, and therefore the present volume, which the officers of this society take pleasure in presenting to its members, has been made unusually large, comprising, as it does, the years 1867–68–69–70. The work has cost for printing, illustrations, &c., $542 20, and on this sum $237 50 has been paid by your treasurer, $120 received from advertisements therein, and $9 50 received from the sale of copies, leaving the sum of $175 20 still due the publishers on an edition of 1,500 copies. The large number on hand will, if sold, reduce this balance to a small amount, if it does not liquidate it entirely.

The members having this matter in charge preferred issuing it in a highly creditable manner, although at an increased expense.

Hereafter, should a report be published annually, the work will necessarily be reduced in size, and consequently cost much less.

I felt exceedingly anxious to make this work self-sustaining, and in the future, with still greater exertions, and in a reduced size, we may be able so to do.

In regard to the plan now pursued for electing new members, I wish to propose an alteration. That adopted by the American Pomological Society, and also used by other associations, is more simple, less liable to engender mistakes, and equally applicable to our own meetings. It is simply that any person may be eligible to membership by paying the sum of ——— annually to the treasurer, in the place of being elected *viva voce*, during our sessions, as now employed. It frequently occurs that the officers are unable to hear the correct names, and more frequently the post office directions are omitted entirely.

Article sixth of our constitution provides for the appointment of professors on entomology, botany, horticultural chemistry and geology, and although such appointments have been neglected heretofore, and by some members considered of little importance, I trust we may consider the subject in an impartial manner, and not carelessly pass it by in the future. Science bears such an important relation to the successful practice of fruit growing that every pomologist should endeavor to acquaint himself with the rudiments at least, and in the place of dry, uninteresting studies, he will be astonished at the constantly recurring sources of pleasure and instruction, requiring his investigation. If the society should deem it proper to appoint suitable members to occupy the positions above named, and request the same to prepare essays within the scope of their respective departments for publication, the value of our proceedings would be greatly enhanced, and a higher standing accorded them, by those who are best competent to judge. I wish it to be understood that I merely offer these remarks as suggestions, and without any desire to dictate to your better judgment, but I trust you may express your opinions in regard to it freely and candidly.

Another question arises relating to the length of time required for holding our annual meetings. Some members are anxious that the society should continue three days, or parts thereof, in session, believing that more good should be accomplished when assembled together; and as several of our members annually come from a great distance, consequently incurring no little expense, it would be advisable to prolong our sessions.

I am aware that some who are deeply interested in our proceedings can not devote so much time to them as others, and herein lies our difficulty. I therefore place the matter in your hands for adjustment.

As our constitution and by-laws have to my mind several objectionable features, I would suggest that the articles embodied therein should be read by the secretary, for the purpose of amending the same. This course will prove advantageous in a double sense, as our newer members will thus have an opportunity of becoming acquainted with the regulations that govern our meetings, and the society at large.

I have now submitted the crude ideas that occurred to my mind in connection with the advancement of our society, and I earnestly desire that you will endeavor to remedy defects, and make important improvements, so that its best interests may be promoted. I shall at all times cheerfully work with you in any capacity for the accomplishment of every project tending towards advancement; and I request that you make such suggestions at this time as will prove beneficial and profitable, not only to this association, but to pomologists everywhere. I stand before you to-night gentlemen, to plead for the success of this society, believing that its welfare is closely connected with the best interests of the whole fruit-growing community of our State. In looking back over the past eleven years, during which our association has had an existence, those of us who have been participants in its pleasures, and who have received the benefits of its teachings, cannot but feel well re-paid for the little time and attention devoted to it; and in the future, with renewed exertion, we may reasonably expect to build up a flourishing society, having already such an auspicious foundation. The few who have stood steadfast from its preliminary meeting to the present time, who have watched its career, as it gradually rose in usefulness, and became a fixed fact, who gloried in its prosperity, and watched its waning powers as the sympathy and encouragement of its old friends fell away one by one, can assuredly congratulate themselves this day that their attachment to its best interests has not been in vain.

I want to see every man in our State, that feels the least interest in fruits, a member with us, each contributing his mite for the good of the whole. We cannot shut our eyes to the fact that Pennsylvania has the ability and experience within her own borders, to form an association, second to no other in the Union, and may the time speedily arrive when such a happy consummation will be effected.

Cordially thanking you all for your attendance at this time, as well as for your attention to my rambling remarks, I wish to add, that as we are about entering upon a new year, you have my best wishes for success in all your undertakings, not only in the orchard and garden, but in all else that make our lives a constant round of pleasant duties; and now it only remains for me to say, in the language of "Tiny Tim," made eloquent by one who has so recently passed away, "God bless us every one."

On behalf of the Pennsylvania Fruit Society I desire to express to the citizens of Chambersburg our most cordial thanks for the kind reception and hearty greeting that has been so generously accorded us, and which will, beyond a doubt, add greatly to our enjoyment, as well as to the sociable character of our convention. For the first time in the history of our association, we meet in the lovely Cumberland valley, renowned alike for the intelligence and hospitality of its inhabitants, as well as for the exceeding fertility of its soil. That such a section of country should become renowned as a great fruit producing centre, does not permit of a doubt, and if we may believe the numerous evidences furnished by your association at Mercersburg, then, indeed, may we all look to our laurels in this respect.

Upon organizing this, the 12th annual meeting of our association, I cannot forbear expressing my most sincere thanks for the interest so evidently shown in our society by its members from every section. None but those who have felt the burden of responsibility resting upon their shoulders, can duly appreciate the kindness and sympathy which you have shown by your presence; and I sincerely trust that you may not be disappointed in the various transactions that will, from time to time, be presented for your approval.

The election of officers being the next thing in order,

The Chair appointed the following nominating committee: H. M. Engle, W. G. Reed, G. H. Small, T. M. Harvey, J. B. Garber.

Mr. Engle here remarked: We are all well aware of the progress that our society has been making of late years, and under none other has it progressed more rapidly than under the presidency of the present President. I therefore move that we re-elect him by acclamation.

President Hoopes—The success of the society is as much due to its other members, especially the Secretaries, as to myself. I will make no further remarks on this subject, but only add that I think you have made a poor selection.

Mr. Engle—We'll risk it.

Josiah Hoopes, of West Chester, re-elected by acclamation.

The report of the nominating committee was approved by the unanimous election of the following subordinate officers:

Vice Presidents.—S. W. Noble, Dr. J. L. Suesserott, J. B. Garber.

Recording Secretary.—Alexander Harris, Lancaster.

Corresponding Secretary.—Thomas Meehan, Germantown.

Treasurer.—Robert Otto, West Chester.

Dr. Suesserott moved the appointment of a fruit committee. Said he, as it is a conceded fact that we owe a debt of gratitude to Mr. Charles Downing for what he has done for us, I move the appointment of a committee to select such specimens of fruit as they see fit, and send them to him as a token of our appreciation of what he has done for us.

President Hoopes here took occasion to mention that Mr. Downing had presented the society with a copy of his book, entitled, "Fruits and Trees of America."

Dr. Suesserott amended his motion, by adding a vote of thanks for the book. The motion carried. The chair named the following gentlemen as the committee: Dr. J. L. Suesserott, S. W. Noble, William Parry, Dr. Franklin Taylor, W. P. Brinton.

The Treasurer now read his report, which, after having been examined by a committee, was found correct:

Statement *of the Treasurer of the Fruit Growers Society of Pennsylvania, for the term* 1870-71.

Balance on hand from last report	$192 21	
Received fees of annual members	65 00	
Do.....do..two life members, at $10	20 00	
Do..from the sale of two certificates of membership,	2 00	
		$279 21

EXPENDITURES.

Cash paid as follows:

1870.			
Jan. 19.	Paid for posters, as per bill	$1 50	
May 23.	H. T. Smallwood, for three lithographic plates, as per bill	70 00	
Aug. 10.	Thomas Meehan, as per order of the President	25 00	
Sept. 27.	Bowen & Co., for printing, as per bill	67 50	
Dec. 7.	Brinkloe & Marot, on account for printing reports	100 00	
1871.			
Jan. 16.	Josiah Hoopes, as per bill	5 50	
			269 50
	Balance on hand		9 71

ROBERT OTTO, *Treasurer.*

West Chester, Pa., *January* 17, 1871.

Chambersburg, *January* 18, 1871.

We, the undersigned Auditing Committee, have examined the account of the Treasurer, and find it to be correct.

CASPER HILLER,
ABNER HOOPES,
T. B. JENKINS.

Henry M. Engle, chairman of the General Fruit Committee, submitted the report of said committee, which was adopted.

Committee on Nomenclature made no report.

Committee on petitioning the Legislature for the establishment of a State Entomological Department continued over.

H. M. Engle moved a committee be appointed to prepare business for the convention. Carried.

The Chair appointed H. M. Engle, Thos. Meehan, Levi Reist, D. W. Herstine, William Parry.

While this committee was preparing a report, opportunity was given to the members of the convention to ask any questions they saw fit.

Mr. Hillar, of Lancaster, inquired the cause of the gnarled and imperfect appearance of an Easter Buerre pear which he exhibited.

President Hoopes thought it the work of a small insect that attacks the trees before the fruit has stopped growing.

Mr. Panaboker desired to know what kind of fertilizers the gentleman used.

Mr. Hillar had used bone-dust and little besides on new ground twelve years ago, and the fruit grown thereon was quite perfect.

Tobias Martin considered the Easter Buerre a good fruit, and never found bad specimens of it when the trees were in good condition, and too much fruit was not allowed to hang upon them.

Mr. Satterthwait remarked that this was the only variety of pear that had failed with him last year; had the same gnarled appearance as already indicated by other members.

Mr. Martin had several trees of this variety and they seemed to be doing well.

The committee on business come in and reported the following questions for discussion:

1. What are the best and most profitable manures for orchards?
2. What are the best and most profitable systems of manuring of orchards?
3. In what does successful fruit growing consist?
4. Do we prune our fruit trees too much?
5. Is underdraining generally profitable in orchard culture?
6. When should fruit be gathered to best assist its preservative character?
7. Do fruits mix by *pollen* on the trees, so as to affect the character of the fruit of the same season?
8. How should apple trees be trained?
9. What is the best system of manuring the earth culture of orchards?
10. What can the Fruit Growers Society do to best encourage fruit culture in Pennsylvania?

Question first was then taken up.

E. Satterthwait had no experience in any other save barn-yard manure, as he never had faith enough in any other to induce him to try it.

Mr. Meehan desired to know if a cheaper and better manure could be suggested than barn-yard manure.

A. S. Fuller still clings to barn-yard manure, but has also faith in bone dust, and beyond that does not go. With these he can grow any fruit.

Barn-yard manure he considered the cheapest of all the fertilizers attainable.

William Parry, New Jersey, was in favor of stable manure if it can be obtained. When it cannot, however, he would say muck was a valuable manure for the fruit grower, and in some sections it is to be found in great quantities. For raspberries this is an excellent manure.

Paschall Morris has learned that for peach and apple trees potash is a better manure than any other. Barn-yard manure, of course, is good, but for some fruits he did not consider it as good as potash.

Thomas Harvey considered barn-yard manure as standing first upon the list and bone dust next to it. Liquid manures are useful. He agreèd with Paschall Morris in his estimate of the utility of potash.

Thomas Meehan found that tan-bark mixed with salt and lime made a good manure. Instead of the tan-bark he has used sedge and grasses, and a composition of their ingredients he has found as good as a stable manure.

Tobias Martin bought land and thoroughly plowed and sub-soiled it and applied no manure, and has been successful in the growing of fruit. He believed "thorough cultivation to be the poor man's manure."

Mr. Willard had seen excellent success in the growing of fruits from the application of salt and lime. He knew a pear orchard of thirty-five acres to which the top-dressings (one of barn-yard manure and one of salt and lime) had been applied, and this orchard was prosperous indeed.

Mr. Williams has had considerable success with phosphate. He planted a pear orchard on poor land and used phosphate and was surprised at their growth. Stable manure is not to be had in his section of country.

Mr. Morris found when he applied barn-yard manure to his pear trees they blighted most of all.

E. Satterthwait has used barn-yard manure to some thousands of trees, and blight is a disease with which they have never been affected.

Mr. Meehan has a very healthy looking pear that stands in a heap of manure, and which, perhaps, has grown there since the battle of Germantown.

Lukens Pierce has been using barn-yard manure for his trees and finds it does well. Roadside sand he has also made use of to great advantage.

Levi S. Reist does not believe in artificial manures when barn-yard manure is attainable. Did he live east of Philadelphia he might be induced to try artificial fertilizers.

Letters were now read from several members, who expressed their regret in being unable to attend the meeting of the society.

On motion, adjourned till 9 o'clock on Thursday morning.

MORNING SESSION.

THURSDAY, *January* 19, 1871.

Pursuant to adjournment, society met at 9 o'clock, President Hoopes in the chair.

T. M. Harvey, of Chester county, spoke of the necessity of all the members of the society being furnished with a copy of last year's report. Many had not received a report because their post office was unknown.

The list of members was read over by the Secretary and their post offices given by members present, and mistakes therein corrected.

Rev. Dr. Willets, of Philadelphia, was, on motion, elected an honorary member of the society. Andrew S. Fuller, of Ridgewood, Bergen county, New Jersey; Henry Williams, editor of *Horticulturist*, New York, and Dr. E. Michener, were elected members of the society.

Mr. Meehan proposed to alter the by-laws, and presented the following resolution:

Resolved, That the nomination and election of new members shall be in order at any time during the session, or the payment of one dollar to the Treasurer at any time shall constitute membership, and entitle said member to a copy of the proceedings.

Mr. Hoopes proposed, as an amendment, to strike out that clause of the by-laws and insert this resolution.

Mr. William Parry thought the clause should not be stricken out, but the resolution should go into operation and both act together—an amendment to amendment.

Resolution, as amended, adopted.

Hon. William Parry, of New Jersey, was now introduced by the President, who proceeded to read an essay upon the "Profits of Small Culture."

PROFITS OF SMALL FRUITS.

BY WM. PARRY, OF NEW JERSEY.

Small fruits, not small in value, but so called because they are found growing on small bushes, vines and plants, were formerly considered as properly belonging to the garden, but now are grown in such large quantities as to require broad acres for their cultivation, and on some farms more land is devoted to their culture than to any other crop.

STRAWBERRIES.

The first fruits of the season, and the most healthful and delicious in cultivation are strawberries, which are easily grown, and when sent to market in good order command fair prices. The varieties of which have become so numerous that it is very difficult for one who has had no experience to determine which to plant by merely reading the descriptions of those offered for sale. After testing over one hundred kinds, I have come to the conclusion that for *profit* a very few varieties are sufficient for any one section, so as to keep up a succession from the earliest to the latest ripening. Some varieties do remarkably well in some locations, with certain treatment, when in other sections they are of but little value. The high reputation that some strawberries have obtained where the soil, climate and surrounding circumstances were all congenial, is a great recommendation in selling plants, but it does not follow that they will succeed when tried in different circumstances which may suit some other varieties better.

Many of us well remember the high expectations with which we looked forward to the coming of that wonderful strawberry, styled "Our 700," in the possession of a prominent fruit grower in the western part of this State, not to be distributed, however, until his own stock of plants should be so large that he could afford to let them go at a moderate price.

During this time of suspense we were treated to the reports of sales in New York of this great strawberry. "*Sixty cents a pint of ten berries each*" was very gratifying to those who expected to get some of the plants.

After being informed of the moderate price of $100 per thousand, at which they could be had, and not wishing to be behind others in getting a stock of that remarkable strawberry, I ordered seven thousand plants, and set them in a seventeen acre field, in which we were planting Wilson's Albany, Russell's Lady Finger, Agriculturist, Green Prolific, Cutter, Downer French and others, any and all of which, with an equal chance, yielded better returns than the celebrated 700, which much resembled though at that time was not known to be the Jucunda. One of my tenants, to whom I had always given all the strawberry plants he wanted, informed me that he intended sending to Pittsburg for plants of some of those large strawberries of which he had been reading in the *New York Tribune*. When I informed him that I had the same kind, and he could have them without cost, he could hardly believe that mine were the same kind; said "they didn't look like those pictures in the *Tribune*."

Now I consider it well established that no one variety is adapted to all soils and locations. Those which I may name as having done well with us in New Jersey, may not succeed in other sections where some varieties do well that do not succeed with us.

But, fortunately, in these United States we have a great diversity of soil and climate, sufficient to accommodate every variety of strawberry in cultivation, and it can only be ascertained by trial which is the best location for each.

One reason for the conflicting reports we sometimes hear in reference to strawberries, is owing to the difference in the soil, climate and treatment they receive.

WHAT KINDS TO PLANT.

There is probably no variety that has yielded more profit to the growers generally than Wilson's Albany. We have grown over two hundred bushels per acre of them, or six thousand and four hundred quarts, which sold at an average of ten cents per quart, gave over six hundred dollars.

Although not as pleasant to the taste as some others, they are good sized firm berries, carry well and look well in market, and consequently sell well.

We should bear in mind that for *profit*, the fruits which yield well and look well are the most profitable to grow.

That the fine qualities and rich flavor of fruits are but secondary considerations with salesmen who dispose of the most fruits in large quantities. If the fruit looks well on the stall, it will have a ready sale, but not otherwise.

There are a few others that have generally given good returns with us, such as Downer's Prolific, Charles Downing and Kentucky, all originated by J. S. Downer, of Kentucky. Perhaps no other person has succeeded so well in raising seedling strawberries, or produced a trio of such value as these three; ripening with the earliest and continuing through the season till after most other strawberries are gone. Three others of great value are the Green Prolific, Agriculturist and No. 30, all grown by Seth Boyden, of New Jersey. They are strong, vigorous growers, hardy and productive, and the two last named, the largest berries we grow, and from their monstrous size and attractive appearance, command the highest price, and brought one dollar per quart in market the past summer when common strawberries were plenty and cheap.

In growing fruits generally for *profit*, it is not necessary to cultivate many varieties, but rather be confined to a few of the best that will give a succession of fruit throughout the season. I have seen plantations of from eighty to one hundred acres of strawberries on single farms, where there were not a half dozen varieties in cultivation. The kinds best adapted to each location paying the largest *profit*. One of the proprietors informed me that he had received a check from his commission salesman of ten thousand dollars at one time on account of his strawberries.

TIME TO PLANT.

Strawberries should always be planted early in spring, the sooner the better after the frost leaves the ground, while it is cool and moist.

Perhaps there is no greater error in the strawberry culture than planting in summer time, after taking a crop of vegetables from the ground, in hopes of getting a crop of berries the next summer. The ground being warm and dry, most of the plants will die, and the few that survive will make but a feeble growth, and it will require more care and labor the next spring to fill up vacancies and get a good stand of plants, than to commence anew on a separate piece of land that had been freshly plowed on purpose to receive them.

SOIL AND PREPARATION.

Almost any ground that will bring good corn or wheat, and is well drained, either naturally or artificially, is good for strawberries. Corn that has been well tilled the year previous is an excellent preparation for them, as grass and weeds are less troublesome after corn than most other crops. The ground should be well plowed and harrowed smooth, and marked out with a small plow the desired distance, according to the variety and mode of culture.

A very common mode is to open the furrows five feet apart and spread manure or compost along them, and plant early corn, one grain in a place, fifteen inches apart, and a strawberry plant alternately between the corn. In that way the strawberries get but little culture except while dressing the corn, which being cut for market early, usually brings from fifty to seventy-five dollars per acre, and the strawberries will spread sufficiently to form good beds for fruiting the next year.

Another plan that has given good satisfaction with me is to open furrows two and a-half feet apart, and spread a preparation of equal parts of marl, ashes and ground bone along the furrows, after it has been mixed and incorporated together for ten days or two weeks, until the heat generated by the action of the ashes and marl has mellowed and softened the bone, so that the particles will crumble like chalk when rubbed between the thumb and fingers, using one ton of the ground bone, and the same quantity each of ashes and marl, on five acres, will give a vigorous growth of dark green foliage to the strawberries.

CULTIVATION.

The ground being frequently stirred with horse and cultivator close to the rows, leaves but a small portion of the ridge between the plants to be loosened with the hoe. As the runners extend and widen the beds, the cultivator is made narrower, and care being taken to pass along the alleys every time in the same direction; drawing the runners always in one way will leave them more even and regular than if drawn both ways, by going back and forth in the same alley. The plants then form ridges about eighteen inches wide, with alleys one foot wide between them. This plan is more certain and reliable than keeping the plants in hills and cutting off the runners. There is less hand labor, most of the cultivation being done by horse power, and if some of the plants should be destroyed by grubs or insects there will be enough left to produce a good crop of fruit.

MULCHING.

At the approach of cold weather or beginning of winter give them a good coat of stable manure, spread evenly all over the plants. If the rows are two and a half feet apart, a horse and each cart wheel will follow along an alley without injuring the plants. The covering with manure is of great importance, as it protects the buds and embryo fruit from severe freezing, and prevents the roots from lifting and heaving out as the frost leaves the ground. The rains soaking the strength of the manure into the soil, gives food and nourishment to the roots. The straw and coarser materials being bleached and beaten close to the ground by the winter's snow and rain, does not prevent the young growth from coming through in the spring, but serves to keep the fruit clean in summer.

HOW MANY BASKETS ARE WANTED.

Crates and baskets should be ordered in time to be on hand before commencing to gather the fruit. Quarts and pints are the most suitable size. It will be necessary to procure at least three times as many as will be needed at any one time for picking, so as to allow for one set to be in market while the second lot is going and a third in the patch being filled. Allowing the crop to yield 2,500 quarts, or seventy-eight bushels per acre, to be gathered at six pickings, of about four hundred quarts each time, it will require twelve hundred quart baskets, which, with crates of the best make, may be rated at about fifty dollars per acre. But as the same baskets and crates will answer for raspberries and blackberries, and with proper care will last several years, ten dollars per acre is sufficient to charge, each crop, for the use of baskets and crates.

WHAT KIND OF BASKETS.

There are now so many varieties of baskets and boxes made that almost every grower can have his choice, but to carry fruit in the best condition they should be made of thin splints, light, strong, and well ventilated, to allow a free circulation of air to carry off the excess of heat and moisture, as the berries are not always dry and cool when put up for shipping. The splints should be so strong that the bottom tier will bear the weight of all the berries, baskets and divisions above them, or the fruit will be mashed as the sides yield to the pressure of the upper tiers of berries. Having used and tested many kinds within the last quarter of a century, I prefer the *Beecher Veneer baskets* to any others with which I am acquainted. They possess all the properties requisite for carrying fruit in good condition, are light, strong and durable, lasting several years with proper care.

PICKING.

There is no part of the business that requires closer attention than gathering and preparing the fruit for market.

It should be assorted as picked, the prime berries put together and the cullens kept separate. The baskets should be well filled and rounded up; the berries placed close and even with stems down, so that when in the crates the divisions above will press gently upon and keep them steady in place. As the fruit grower is "no respecter of persons," but in the busy season, employs men, women and children of all ages and denominations, whose object is to make the most they can, and as they are usually paid by the quart, every berry picked whether good, bad or indifferent will help to fill up the measure and would be a loss to them if not put in the basket. So that it requires some moral courage for the pickers themselves to put the fruit up in the best condition for sale.

To assist in this matter, we provide them with baskets of a different size, in which to put the imperfect and faulty berries, so they will measure as much as if all were mixed together.

As the berries are brought in for packing, ten or twelve baskets on a tray, they are carefully examined and at least one emptied in presence of the pickers; if they turn out all right, they are paid in white tickets; but if small, green or faulty berries are mixed among the prime ones, or they are not put up as directed, a blue ticket of less value is given, which has a salutary effect, as it is mortifying for them to receive a blue ticket, which is the signal of bad work, in the presence of others.

The system works beautiful; it is a constant stimulant for right doing. It don't hurt the best of hands to look after them, but is rather gratifying for them to know that their employers are aware of and appreciate their work; and work that is not well done does not receive full pay.

YIELD AND PROFIT.

There are so many circumstances connected with strawberry growing, such as varieties, soil, climate, location, markets and the skill and management of the grower, that the results of a few cases cannot be relied on as a general rule.

The premium crop in Burlington county, N. J., was at the rate of of 263 bushels per acre, yielding a profit of upwards of $1,000. But one-third of that amount would be nearer our general average. For ten years past, our whole crops have averaged about 2,500 quarts per acre, and averaged 12 cents per quart in market, giving the following results:

2,500 quarts, at 12 cents		$300 00
Commission, 10 per cent	$30 00	
Picking, at 2 cents	50 00	
Interest on land	10 00	
Manure	25 00	
Use of baskets	10 00	
Cultivation, &c	30 00	
Net profits	145 00	
	300 00	300 00

RASPBERRIES.

The raspberry coming next to the strawberry, is a fruit of great excellence, usually sells higher than strawberries and is really worth more to the consumers. The fruit is heavier, richer and will go further as a dessert. There is no waste of time and labor in preparing them for use, as the hulls are left on the bushes when picking the berries. Our markets have not generally been well supplied with raspberries, owing to the difficulty in getting hardy varieties that would stand our changing climate; most of those that succeeded well in more northern latitudes, and were highly recommended for general cultivation, would not carry their foliage through our warm summers. And the canes would be injured before the approach of winter, and whether protected or not, they were of but little worth in the spring.

An erroneous impression has to some extent prevailed, that raspberries which are called tender at the north, may do well at the south without protection. But raspberries do best in a cool climate, and many that succeed at the north are of no value at the south. Although some few native kinds, distinguished by their color, as red, white and black, have been grown time out of mind, it is but recently that much attention has been given to growing improved varieties.

IMPORTED RASPBERRIES.

For many years strong efforts were made to introduce the fine English and French varieties, and to grow seedlings from them, thinking they would be more easily acclimated, but with no better results than have followed the foreign gooseberries and grapes that have been tried in open field culture.

At this time there is no foreign variety worth growing in the open field that is generally adapted to our soil and climate.

The Hornet and Antwerps are berries of superior excellence, and it is to be regretted that the locations in which they succeed are so very limited. But when all the surrounding circumstances of soil, climate and treatment are exactly congenial, they yield large crops of the finest fruit, which commands the highest price in market.

A fruit grower in Camden, N. J., about three years since, had one-eighth of an acre mostly of the Hornet raspberry, which produced three hundred and thirty-six quarts, sold at ninety cents per quart, yielding at the rate of two thousand and four hundred dollars per acre.

The following year the crop was all taken by one dealer at seventy cents per quart. Last year when I was there to examine the plantation, which is much larger now, so that they were picking about one hundred quarts daily, the owner informed me that the same person had engaged the crop again at sixty cents per quart for the season. That is the only instance in my knowledge of perfect success with the Hornet.

Other plantations near by made from the same stock are all failures.

NATIVE RASPBERRIES.

Owing to the great difficulty attending the cultivation of foreign varieties as a field crop for market, the attention of fruit growers has been turned to the improvement of our hardy, native raspberries, of which there are two distinct species: The Rubus Occidentalis, which is propagated by the top end of the canes bending over and striking root in the ground, forming a new plant, which in turn sends out shoots reaching still further from the original stock, and thus in a migratory manner soon spreads over a considerable space of land.

The Purple Cane and Ellisdale are of this order, and the Catawissa to some extent. The White, Yellow or Golden Cap, Golden Thornless and Cream raspberries.

Also the different varieties of the Black Caps, such as the Doolittle, Miami, M'Cormic or Mammoth Cluster, Davison's Thornless, Seneca, Garden, Great Western, Hamilton, Yosemite, Ohio, Canada, and Lurn's Everbearing, and many others of less value.

I have not met with an English variety grown from tips, nor a black raspberry grown from suckers.

BEST BLACK CAPS.

The Doolittle and Mammoth Cluster are the most profitable black raspberries with which I am acquainted. The former is early, firm and carries well to market. The latter is larger and later. Both are strong, vigorous growers, hardy and very productive. Having thirty acres of them growing, I have found them to pay well, producing more bushels per acre than corn, with less care and culture, and after being once planted will continue for seven or eight years yielding annual crops without renewing. The other species to which allusion was made is the Rubus Strigosus, an upright grower, which is increased by suckers from the roots and by planting root cuttings, but not from the tips. Our Native Red raspberries are all of this class, and seem quite local in their habits. Many of the finest will only succeed in certain sections where the climate and soil are just suited to their wants. It is sometimes hard to account for the conflicting reports made in reference to the same raspberry from different sections of our country. The Allen, a beautiful and delicious red raspberry, yields good crops in some locations, and from its fine appearance and excellent qualities always commands a high price, yet in other places it would not produce fruit enough to pay for the ground occupied. The Kirtland, a bright red raspberry, firm, early and very desirable for market, is highly spoken of in northern Ohio, but with me it is worthless, having tried it on a variety of soil, from that which is moist and sandy to a rich clay loam, but in all cases the greater part of the leaves would fall off before the end of summer, the canes would be injured before winter, and they would produce but little fruit the next year.

The Franconia, Naomi, Clarke Wauregan, Elm City, Prosser Red Queen, Duhring, Lindsley's Fastolff Seedling, Downing, Linton and all of Dr. Brinckle's choice seedlings, the celebrated Orange Cushing, Col. Wilder, Cope, Vice President French, Walker, Woodward and others were all affected in the same way; also the Hornet, Antwerp's Fastolff, Knevett's Giant, Northumberland Fillbasket, River's Large Fruited Monthly, Thunderer and all other foreign varieties that I have tried, excepting the Belle D'Fontenay, and that is not of much value.

PHILADELPHIA RASPBERRY.

Productive red raspberries being very scarce, it seemed for a while that we would have to rely on the Black Caps for a supply of fruit. Fortunately the *Philadelphia* was brought into notice, which was greatly in advance of any other raspberry then known.

A red raspberry, as hardy and productive as a Black Cap, so easily grown, adapted to all soils and conditions in which any raspberry would grow, was a great acquisition, and it has been largely planted all over the country, producing large quantities of fruit for market and yielding handsome profits to the growers. I have known them to produce two hundred bushels per acre, and to yield at one picking one hundred and ten dollars per acre. The *Philadelphia*, as a *hardy* and *productive* red raspberry, adapted to all sections of our country, is ahead of any other known variety. Yet it has not the bright red color which is so attractive and pleasing to the eye, nor firmness of flesh to stand up well in market after a long journey.

There is room for still more improvements. If we could have a raspberry combining the good qualities of the Philadelphia, hardy and productive, with the additional ones of large size, bright red color, and firm flesh, it would be a great acquisition. There are several other hardy raspberries, though not as productive as the Philadelphia, yet brighter and handsomer and sell higher in market.

The *Pearl* is a bright red, medium size, handsome, firm berry, carries better and sells higher than the Philadelphia; bush dwarfish, a slow grower with thick tough foliage.

Susqueco, a large, bright scarlet berry, firm and beautiful, bears transportation well, and commands a ready sale in market. The foliage and general appearance much resembles the Pearl, from which it may be a seedling. The leaves put out a week earlier in the spring and make a stronger growth.

The *Baker* and *Parnel* sent out from Cincinnati have fruited with me, appear hardy and promise well.

MARKET PRICES.

Raspberries sell in market according to their appearance. Large size, firm bright red berries going at the highest figures, from which the price descends to the Black Caps, the lowest on the list.

A comparison of their prices when the market was well supplied will show the estimation in which they were severally held. On the 7th day of July last raspberries were sold at wholesale in Philadelphia, as follows, viz:

Black Caps	5	cents	per quart.
Philadelphias	8	"	"
Pearl	16	"	"
Susqueco	30	"	"
Hornet	60	"	"

From the above figures we can readily arrive at the true points of excellence for a market raspberry.

It should have the size of the Hornet, color of the Pearl, and productiveness of the Philadelphia.

Fortunately we have an amatuer cultivator residing in Philadelphia, who has been experimenting largely in raising seedling raspberries, and by planting the Philadelphia, the most productive of all, by side of the bright Red and delicious Allen, both of which are hardy native varieties, so that the pollen from their blossoms might become thoroughly mixed, and then raising seedlings from the berries thus impregnated, has succeeded in producing a raspberry that bears his name, combining more good qualities than any other, as large as the Hornet, bright as a Pearl, as hardy and productive as the Philadelphia and delicious as the Allen, and properly named the Herstine.

The committee of the Pennsylvania Horticultural Society, who examined them in bearing, gave the following description of the Herstine: Plant a good grower; most abundant and early bearer; sucker moderately; canes strong, of a pea green color, covered with white bloom; spines green, but not abundant; foliage healthy, of medium size, and often lobed, of a pearl gray color on the under side; fruit large, oblong, with small grains and crimson color; flavor sub-acid and very good. There were several other seedlings examined by the committee, some of which were described as "Ruby," "Saunders" and "Elizabeth," having marks of great merit. They further stated that the "plants examined were entirely unprotected during the winters, without being at all injured. And should they continue on further trial, to be as hardy as they certainly are productive and delicious, we have no hesitation in believing that they will fill a void in the raspberry world, which has long been felt, viz: A raspberry suitable for market purposes—combining hardiness, productiveness, firm flesh, and bright color, with a delicious flavor."

I have seen them in fruit for two years, and in different soils, both light and heavy. In every situation they presented the same vigor and healthy appearance of canes and foilage, and were heavily laden with fruit of the largest size and finest quality.

SOIL AND TREATMENT.

The management of hardy raspberries is very simple. The soil should be rich and mellow, and liberally supplied with manure and fertilizers. Ground bone and phosphates are excellent. It should be thoroughly drained. Raspberries will not succeed in wet soil.

Plough and prepare the ground, as for potatoes or other crops; mark the rows six feet apart, and set the plants three feet distant in the rows, requiring about 2,500 plants to the acre. The tops should be cut down to within a few inches of the ground, that the roots may become well established before they are required to supply nourishment for long tops of green foliage.

Carrots or potatoes may, with advantage, be grown between the rows the first year, after which the raspberries will require the whole space. Stir the ground frequently with horse and cultivator, to keep down grass and weeds, being careful during the warm, dry weather not to disturb the small roots feeding near the surface by deep culture near to the plants.

The old wood which has borne fruit should be removed before the following spring, and the young canes shortened to about one-third their length, so they will stand firm and erect, bearing heavy crops of fruit without stakes, trellis or protection of any kind. The raspberries should be carefully picked in small baskets, not larger than pints, better less. Both baskets and crates should be ventilated, so as to allow the circulation of air to absorb the heat and moisture, as they will bear transportation to market much better when cool and dry.

YIELD AND PROFIT.

The raspberry is liable to many casualties that will injure the crop. An excess of heat or cold, wet or drought, and sometimes causes unexplained, will disappoint the fondest hopes of the grower.

And the price varies greatly with the quantity and quality of the fruit, so that the results of several years should be taken together to form a correct estimate. I find, by a careful review for ten years past, that all the raspberries we have sold, red and black, good, bad and indifferent, have averaged twenty-three cents per quart, which gives about the following result per acre:

2,000 quarts, at 23 cents		$460 00
Commissions, at 10 per cent	$46 00	
Picking, at 3 cents per quart	60 00	
Interest on land	10 00	
Manure and use of boxes	30 00	
Cultivation, incidentals, &c	30 00	
Net profit	284 00	
		460 00

Under some circumstances, much greater profits than the above are sometimes realized. But it is better to keep our views within moderate limits, and be agreeably disappointed with larger returns, than otherwise.

BLACKBERRIES.

Blackberry bushes, formerly considered a nuisance, are now highly appreciated and extensively cultivated, many farmers growing more acres of them than of corn and wheat together.

It is somewhat remarkable, that in this age of horticultural progress, there has been no seedlings raised better than those found growing wild on the commons without care or culture.

Attempts have been made to get blackberry bushes without thorns, and some have been found with canes nearly smooth, which created quite a sensation for a time, and the plants sold readily at five dollars each, until it was ascertained that the fruit was as much deficient as the thorns. Various colors have been brought out, white, red and purple, which were novel-ties in their way, but of no practical value in point of profit to fruit growers. After carefully cultivating and testing twenty-six varieties, in addition to a large number of seedlings which were no better than the parent stock, I have retained four, which are all valuable as field crops for market.

WILSON'S EARLY.

At the head of the list I name Wilson's Early, the largest blackberry in cultivation, ripening early, close after raspberries, before peaches are in market, when fruit is scarce—it commands the highest price. Two years since, we sold the principal part of our crop from ten acres, at fifty cents per quart, wholesale, which were afterwards sold in smaller quantities as high as one dollar per quart. This variety is being extensively cultivated. One fruit grower in West Jersey, having seventy-five acres of them in bearing, received the past year $20,000 for the fruit, realizing a clear profit, after deducting expenses, of $14,000, gathered within the space of three weeks' time.

DORCHESTER.

Next in point of profit to the Wilson's Early, is the Dorchester, which has an upright, strong growing bush, tall, erect and perfectly hardy. For twelve years past they have done well with me, never being injured by the winter, even when the New Rochelles were mostly destroyed. They have always yielded good crops of fair sized berries, long, shining black, sweet and firm, so as to carry well to market, and being early, they sell higher than the Kittatinny, New Rochelle or any other late ripening blackberry which follows them. This variety is well adapted to planting in orchards of apple, cherry or peach trees, being straight, upright growers; the bushes are less in the way of cultivation than other varieties that curve out from the rows and obstruct the passages between them. The protection afforded by the trees, both in winter and summer, is beneficial.

In 1863 I planted an apple orchard forty feet apart each way, then a row of Early Richmond cherries each way between them, requiring three times as many cherries as apples, then a row of Dorchester blackberries in the rows of trees and between them, which left them at the proper distance of ten feet apart.

They have all done well; the apple trees have made a fine growth and born some fruit; the cherries and blackberries have yielded fine crops of fruit every year since old enough. The cherries ripen first and are out of the way before the blackberries commence. So that the draught upon the land is not so great as if both crops ripened at the same time.

The earliest and finest Dorchester blackberries raised in our section are grown in old apple orchards.

In the spring of 1864 I sold a fruit grower near Burlington, N. J., Dorchester blackberry plants for two and a half acres, which were set among peach trees on new land, light and sandy, from which the pine timber had been recently removed. In 1865 they commenced fruiting, yielding about enough to pay for tillage, the space between the rows being profitably occupied with tomatoes and other vegetables for market.

In 1866 they produced, exclusive of commissions	$600 00
In 1867....do....do....do	1,300 00
In 1868....do....do....do	2,057 64
Total in three years	3,957 64
Deduct cost of picking	287 64
Leaving	3,670 00

Clear profit above the cost of picking and commissions, or an average of $480 per acre for each of the three years in bearing.

In addition to the sale of fruit, large quantities of plants were dug and sold, more than enough to pay for the original stock to commence with.

This is a better average for profit than usual, and one cause for the large returns was that blackberries in many places were badly winter killed; the Dorchesters standing the cold better than other varieties, and especially when planted in orchards and protected by the trees.

The Kittatinny comes next in order as a profitable berry to grow for market, it is perfectly hardy, large, lucious, and very productive.

And last the New Rochelle, which has been in cultivation longer than the others, but is now superseded by them.

Blackberries are among the most profitable fruit crops, their easy culture, hardiness, productiveness and the high price at which the fruit sells, gives them a great advantage over others requiring more expensive cultivation. They are not particular as to soil or location, but will yield well where ordinary crops will grow.

It is not necessary to select the best land for a plantation, as the canes would there grow so large and rank, as to require much time and labor to trim and keep them within bounds. They need but once planting, as the bushes renew themselves annually thereafter, by sending up a spontaneous growth of young suckers to bear fruit the following year; and with an occasional dressing of manure, they will continue to give large returns for many years.

I have grown on ten acres, for several years, from 650 to 700 bushels, and one season 800 bushels, being an average of over seventy bushels per acre; while land adjoining, equally good, planted with corn, did not yield fifty bushels per acre.

PREPARATION OF THE GROUND.

The land should be plowed and harrowed smooth, then open furrows eight feet apart; if muck is convenient, it is valuable to spread along them, then set the plants about four feet distant on the muck. The roots will mostly follow along the row to feed on the muck, and grow more vigorously than lateral or side roots.

Hence, the strongest and best plants will come up along the row nearly where they are wanted to produce fruit the following year. They should not be left to stand closer together than an average of one plant to a foot in length in the rows.

PRUNING.

The plantation should be gone over several times during the summer, and the tops of the young canes, as they appear above the bearing bushes, should be shortened in, so as to keep them at a uniform height of about three to five feet, according to their strength. This will cause the side branches to grow vigorously, and develop fruit-buds near the ground, and interlocking with each other, the bushes will support themselves, and avoid the necessity of stakes and wires to prevent high winds from injuring them. The side branches should be shortened in the following winter or spring.

Plants thus trimed will yield more fruit and of better quality, than if left to grow tall and slender, as by nature they are inclined to do.

I have sometimes left a few rows without pruning, and others pruned but little, which fully illustrated the great importance of shortening in the branches. The unpruned bushes would bear more fruit than could be ripened on them, it would remain red a long time and finally dry up, being of no value. The best and earliest fruit would be on the bushes well pruned, so as to throw the whole strength of the roots into fewer berries.

PRICE OF BERRIES AND PROFIT.

The average price for ten years past of the blackberries we have sold of all kinds, has been fifteen and six-tenths cents per quart, which gives about the following result per acre:

2,000 quarts per acre, at $15\frac{6}{10}$ cents		$312 00
Commissions, at ten per cent	$31 20	
Picking, at 1½ cents per quart	30 00	
Interest on land	10 00	
Use of boxes	10 00	
Pruning, cultivating, &c	30 80	
Net profits per acre	200 00	
		312 00

Strawberries, *Raspberries* and *Blackberries* are usually included under the head of *Small Fruits*, the *profits* of which are generally good, when markets are convenient and care is taken in the selection of varieties and in giving them proper treatment. Sometimes we hear of extravagant reports, calculated from the product of a small lot up to what a ten acre field under similar circumstances would yield.

A safer rule is to take the acres and see what they have produced annually. We kept a debtor and creditor account for several years, with twenty-two acres in small fruits, which averaged, after deducting expenses, $272 per acre.

By reference to the third annual report, page 21, of the West Jersey Fruit Growers Association, who appointed committees to collect the returns from all the fruit growers in the neighborhood, it will be found that 776 acres of land in strawberries, raspberries and blackberries, produced the sum of nearly $200,000, or about $250 per acre.

CRANBERRIES.

My remarks on "Profits of Small Fruits" would not be complete without referring to the cultivation of cranberries, which is a very profitable branch of small fruit culture, where the soil is adapted to their growth, and must eventually assume proportions and importance scarcely second to any other fruit crop grown in the State of New Jersey. We have thousands of acres unavailable for other purposes, but specially adapted to producing cranberries. Low, marshy lands and old ponds that can be drained and flooded again at pleasure, which in their natural state would not be valued at more than ten to twenty dollars per acre, after being cleared and planted, will often yield two to three hundred dollars per acre in cranberries annually, and sometimes more.

A fruit grower in Burlington county, New Jersey, recently cleared up and planted twenty acres of moist land, which five years since was valued at five dollars per acre. Last year had two acres in full bearing, and eighteen acres only two years old, yet he realized from the cranberries grown there a net profit of three thousand and two hundred dollars.

Another farmer and his sons, residing near by, have two hundred acres planted with cranberries, about one-third of which are in fruiting age, and yielded last year 3,300 bushels of fruit, worth over $13,000, six acres of which averaged one hundred bushels per acre, and were sold at four dollars per bushel.

Another farmer, in the same county, in 1869, had twenty-four acres in fruiting. Six and a half in the tenth year of bearing, and seventeen and a half in the first year of good bearing, which yielded 2,692 bushels of cranberries, and sold at three and a half dollars per bushel, brought $9,422;

and after deducting $2,222 for expenses, taxes, superintendence and commissions, left a net profit of seven thousand and two hundred dollars on the twenty-four acres, averaging three hundred dollars per acre. The six and a half acres in the prime of bearing yielded more bushels of fruit than the seventeen and a half just commencing.

The Forge Company, near West creek, in Ocean county, N. J., have about one hundred acres planted, fifty of which were in fruiting the past season, and yielded 3,400 bushels of cranberries, worth, at four dollars per bushel, $13,600. Three-eighths of said tract was recently sold at one thousand dollars per acre. I might mention the names of those parties, if necessary, but the object in referring to them was merely to enforce the principles and facts illustrated by their successful operations, which many others are pursuing; and hundreds of acres are annually being redeemed from a primitive, unproductive condition and devoted to cranberry culture.

There are now in New Jersey about two thousand acres in fruiting, and produced last year 150,000 bushels of cranberries; and four thousand acres more land have been prepared and planted, and will be in fruiting hereafter.

New Jersey now supplies more than two-thirds of the whole amount of cultivated cranberries marketed in the United States.

The late reports by the Agricultural Bureau, at Washington, for the year 1869, give as follows, viz:

To the State of Maine	1,000	barrels.
Do.....do...Massachusetts	8,000	do.
Do.....do...Connecticut	2,000	do.
Do.....do...New Jersey	50,000	do.

This amount of 61,000 barrels was derived principally from cultivated fields.

All other States and Territories, including wild and cultivated cranberries, produce about 14,000 barrels, making a total of 75,000 barrels for the year 1869. The crop for 1867 was estimated at 62,500 barrels, of which New Jersey produced 35,000, New England about 12,000, and the west 15,500 barrels. The average price for 1867 was $16 per barrel, giving a total value of one million dollars for the crop that year. The crop of 1869 commenced to sell at picking time in Philadelphia for nine dollars per barrel, and gradually advanced in price until spring, when the market value was twenty-four to twenty-six dollars per barrel.

One grower in Burlington county, it is reported, sold a lot of six hundred barrels for fifteen thousand dollars.

The price of cranberries during the present winter has been about twelve dollars per barrel in Philadelphia. For seven years, from 1862 to 1869, the price ranged from fourteen to fifteen dollars per barrel, except in 1868, when the price was from twenty-two to twenty-four dollars per barrel, owing to the light crop.

The counties of Burlington and Ocean yield the greater part of the cranberries grown in our State, and in 1869 they produced 31,700 barrels, and all other counties in the State yield 18,300 barrels. The yield of cranberries last year was not so large per acre as in 1869, on account of excessive rains, with intervals of intensely hot sun during the time of blooming. But the quantity of land in fruiting was more, so that the yield for Burlington and Ocean counties amounted to 38,300 barrels, and the State producing about the same as in 1869, say 50,000 barrels, which, at the present value, gives $600,000.

In embarking in the cranberry business, one of the most important matters is the selection of suitable land. The most productive cranberry region in the State, is a belt of land underlaid with white sand, much of it pure silex, the upland covered with pine and scrub oak; the low land and borders of streams, with white cedar and an undergrowth of whortleberry bushes. The soil is light, a thin coating of vegetable mould covering the surface.

The climate as well as the soil of this part of New Jersey is well adapted to the cultivation of this vine in the highest perfection. The picking is usually done by men, women and children, at a cost of about fifty cents per bushel; many of the hands will gather three to four bushels each per day. In sections of country where strawberries, raspberries and blackberries are extensively grown, a good portion of the pickers come from the rural or cranberry districts, commencing with strawberries in June, and after finishing them, enter the raspberry fields in July, and in August the blackberries are gathered, after which they return home in time to commence in the cranberry fields in October, and frequently have steady work there until cold weather, thus having a long, continuous harvest; such of them as are industrious and frugal, may soon provide homes for themselves and become proprietors of berry fields, and in turn give employment to others who are pursuing the same course of honest industry, a sure passport to wealth and competence.

Upon the conclusion of the address, Thomas Meehan desired the question to be put if small fruits can be grown with profit when attention is wholly given to their cultivation. He remarked it as the opinion of some, that it is more profitable to combine the growing of some other agricultural product with that of small fruits.

William Parry instanced corn as a vegetable that could be grown profitably upon the same ground with strawberries, and the corn will pay for the occupancy of the ground the first season. Onions can also be grown amongst strawberry vines and be of profit after the berries.

E. Satterthwait remarked it as his plan to grow all sorts of fruits and vegetables together. He plants between his rows of pear trees small fruits and vegetables, and believes it an excellent plan. In close proximity to a good market it may pay to raise small fruit exclusively.

Mr. Meehan inquired if small fruits would not pay grown alone.

Mr. Satterthwait replied that at a long distance from market he thought they would not pay if raised alone.

Mr. Fuller thought, as a general thing, something else must be grown in connection with small fruits to make the land pay for their culture. More money has been made by the sale of plants than in the growing of fruit. But yet there is a pleasure that flows from the growth of fruit that is above mere money consideration.

Mr. Engle thought fruit growers should stand upon a higher plane than the mere making of money.

Mr. Parry having been asked concerning cranberry culture, said that they can be grown with small quantities of sand and muck. The greatest need for the cranberry is air and moisture.

Mr. Williams thought fruit growers expected too much in their business. If he can make two hundred dollars per acre in the culture of small fruits he is satisfied. Many seem not to be at all satisfied with this return. Even one hundred dollars per acre is a fair yield.

Paschall Morris detailed the experience of a friend who had been growing strawberries under glass and selling the same for four and five dollars per quart.

H. M. Engle had tried the forcing of strawberries, for which he was never able to realize more than three or four dollars per quart.

Mr. Herstine doubts if the forcing of small fruits can be made to pay. Had more confidence in the growing of fruit in cold frames. This he had pursued with some success and sold his berries at good prices. Of strawberries he regards the Wilson's Albany as the best for cold frame culture.

On motion, society adjourned until 2 o'clock P. M.

AFTERNOON SESSION.

The Society was called to order at 2 o'clock.

The President announced that Dr. G. L. Houghton, from whom an address was now expected, had not yet arrived. The address was deferred until later, under the expectation that he would arrive in the meantime. The manuscript of the address was in the possession of Mr. Herstine, who kindly offered to read it if the Doctor did not make his appearance.

The President suggested that some one of the questions proposed by the

Business Committee should now be considered. Messrs. Engle and Meehan thought the third one, "In what does successful fruit growing consist?" would be a good one.

Mr. Meehan said the question seemed to him a very general one. Some regard successful fruit growing as due to capital or skill, or to the combination of vegetable with fruit culture.

H. M. Engle said that opinions were very conflicting on this question. The various reasons therefor must be sought in the diversities of soil or in something not yet clearly discovered.

Not much interest being taken in this question, it was suggested that another should be taken up.

Mr. Bertram desired to hear the subject of the pruning of fruit trees discussed.

Mr. Satterthwait is of the opinion that considerable harm is done by pruning. Mr. Saunders has given it as his opinion that very little pruning should be done and the speaker agreed with him. Trees intended for dwarfs must be kept down by pruning, as some contend, but in my case the more I pruned the more my dwarfs grew. He, therefore, must say that in his opinion there is too much pruning of trees.

Mr. Engle thought that pruning done in the winter was beneficial, while in summer it is the contrary.

Mr. Meehan does not believe in pruning in any case, whether in summer or winter. It weakens vital force. Yet some pruning must be made use of so as to give each limb and sprout room enough to grow. Yet in doing so we must sacrifice a little of the abstract vitality. Like the physician, we must first see the patient in order to first determine if he can be cured by that remedy.

During the discussion, President Hoopes remarked that one of the members had a short essay with him which treated somewhat on this subject, and if it was the wish of the society to have it read, the gentleman, he had no doubt, would be willing to favor them with it.

The society voted that it be read at once, and President Hoopes introduced Hon. William Parry, who prefaced the reading of his essay by the following remarks:

There is a little weakness in my character—according to my friend there—for I confess to a love of the profit as well as the pleasure of fruit growing. I am surprised that the people of this beautiful Cumberland valley do not engage more in the raising of fruits. There is profit in it. I raise strawberries, dry them and supply the world. There is pleasure in it. I do as my friend does. Arrange your fruits so as to be *independent* of the market. We see by those specimens there, that there is no better place than this valley for apples. I think the peach would be at home on these limestone lands. I do not know why you don't raise them, may be it would be too profitable; perhaps you are looking more to the pleasure. But as I have a few remarks to make in reference to the peach, with the permission of the President, I will now read them to you.

PEACHES.

BY WM. PARRY, OF NEW JERSEY.

The peach is a native of Persia, and was introduced to this country by the early settlers. It is never raised in England, and not generally in France, without artificial aid. There is probably no other country in the world where peaches are grown in such quantities as in the United States. Thousands of acres of land in New Jersey, Delaware and Maryland are devoted to this crop. I sold over 30,000 peach trees at one time to a fruit grower for his own planting, which he set on about 300 acres of land in Maryland.

A new peach orchard will not succeed on the site of an old one, but is well suited to new land.

It is rarely found in any locality that every condition is perfectly adapted to their growth, and it becomes necessary for the cultivator, as far as circumstances will admit, to supply the deficiency of nature. If the soil is hard and tenacious, loosen well with a subsoil plow; if saturated with water, make artificial drains to carry it off; if poor and thin, add fertilizing materials—lime, ashes and bone dust are excellent for that purpose.

The ground should be plowed and harrowed smooth before planting. Then, with a small plow, one horse and straight poles, mark out the furrows, eighteen feet apart, each way, at right angles to each other; then plant a tree at each cross furrow, so that they will range both ways.

Avoid deep planting; set the trees no deeper than they grew in the nursery—rather mound up the earth, leaving the top a little dishing, to collect the rains, and allow the roots full benefit of the surface soil, in which to search for food.

PRUNING AND CULTIVATION.

After planting, go over the orchard and cut off the tops at the uniform height of three feet, and trim the side branches to within half an inch of the body, somewhat resembling a rustic walking cane.

In the spring, as the young shoots put forth, allow them to grow and form low heads; they prevent the hot sun from scorching the body of the trees, are less exposed to high winds, and the fruit is more easily gathered.

The ground should be planted with corn, potatoes and vegetables for a year or two, until the trees commence bearing, after which the orchard should be plowed several times a year to keep the surface mellow and free from weeds and grass, using a single horse, with short single-tree, next to the trees.

I once sold 1,000 peach trees to a merchant in Philadelphia, who desired to go into the fruit business. He had them carefully planted on about ten acres of land. Next year he got a new tenant, highly recommended as a thorough going worker. He took a yoke of oxen and went into the peach orchard to plow, but finding the trees somewhat in the way of his team, pulled them all up by their roots and heeled them in along the fence while he done the plowing, saying that "he could do it better with the trees out of the way." That merchant soon sold his farm, remarking to me that "fruit-growing didn't pay."

The trees should be examined two or three times during the season, and all worms removed from their roots, the place of which may readily be known by the gum oozing from near the surface of the ground.

PROFITS.

Where markets are convenient, there are but few other crops that give so large and quick returns for the capital and labor required to grow them.

Many persons have made fortunes, while the prosperity of large sections of our country is owing to this remunerative crop. In 1869, although fruit was abundant, freights high and prices comparatively low, several fruit growers, whom I could name, sold from twenty thousand to sixty thousand baskets each, at an average price, after deducting the expenses of picking, freight and commissions, of fifty cents per basket, yielding them various sums from $10,000 up to $30,000 each, clear profit; all gathered in about six weeks.

I was recently informed by a prominent peach grower of an orchard eight or ten years old, of only 1,700 trees, yielding one year over 8,000 baskets of peaches, that netted the owner $4,400, and a subsequent year the same orchard yielded 7,100 baskets, which netted $4,700.

A fruit grower near Delaware city last year had 140 acres in peach trees, and cleared over $16,000 from them.

A peach grower near Middletown, Delaware, who formerly went from New Jersey, had 400 acres in peaches last year, and although not a full crop, was offered $30,000 for them, but refused to sell, and had them picked and marketed on his own account, and cleared $38,000.

Many of us are no doubt familiar with the history of the "Peach Blossom Farm," in Kent county, Md., containing 600 acres, with 400 acres in peach trees just coming into bearing, that was sold at public sale, in the winter season, a few years since, for $31,500. That same year the purchaser

sold peaches from it to the amount of		$52,000
And after paying for picking	$1,500	
Transportation to market	9,000	
First cost of farm	31,500	
Cash paid for steamboat	10,000	
	52,000	52,000

The business done on the Delaware railroad and branches in carrying peaches is immense.

Several trains may sometimes be seen moving with 18 to 20 cars, each carrying about five hundred baskets to a car.

The freight on peaches sent over the Delaware roads to New York is reported to amount to $264,000 last year.

From the official report of the shipment of peaches by railroad for the season of 1870, giving the number of baskets and crates taken from each station on the Delaware railroad and branches, reduced to baskets by the master of transportation on the Philadelphia, Wilmington and Baltimore railroad, it appears there were shipped from stations on

The Delaware railroad	1,039,034	baskets.
Kent and Queen Anne's	157,801	"
Maryland and Delaware	136,672	"
Junction and Breakwater	6,089	"
Dorchester and Delaware	39,611	"
Wicomico and Pocomoke	179	"
Eastern Shore railroad	30,693	"
Total	1,410,079	"

Of which the State of Maryland furnished about 300,000 baskets. In addition to the above there was sent to market by water about one-fourth as much more.

In 1869 there were sent from Delaware, by railroad, 2,087,987 baskets, and by water, 662,020 baskets; total, 2,750,000 baskets of peaches, worth to the citizens, at forty-five cents per basket, the reported average, one million two hundred and fifty-seven thousand and five hundred dollars.

Last year, 1870, the crop was not so large, being only one million and five hundred thousand baskets sent by both modes of conveyance, railroad and water, but the fruit was better grown and the net profit about fifty per cent. more per basket, yielding from seventy to seventy-five cents per basket clear, amounting to one million one hundred and twenty-five thousand dollars, net returns for the crop shipped to market, though several orchards were sold at from eighty to ninety cents per basket. The crop grown was not near all sent to market direct from the orchards; much larger quantities were used at home than ever before, in the canning establishments recently put up there.

The plan of canning fruits in the neighborhood of the large orchards has many advantages. One reason why the fruits have so much higher credit in the market, than when carried a long distance over rough roads, passing through different hands, consuming several days time before reaching the factory, is that they are not picked until full ripe, and then while in the best condition, being full of sweet juice and rich flavor, are quickly prepared and ceiled up in cans.

Peach growing is rapidly extending into Maryland, as appears by the following returns.

There were shipped over the Maryland railroad, in 1869, two hundred and twenty-four cars loaded with peaches, and in 1870, although not so fruitful a year, two hundred and sixty-five cars loaded, averaging about five hundred baskets to a car, being an advance of eighteen per cent. over 1869.

Last summer I had the pleasure of visiting some of the principal orchards near Smyrna, Delaware, while in fruit, and through the politeness of George W. Cummins, one of the most careful and successful fruit growers, was shown his extensive plantation of peach trees, which were beautiful to look at, affording both instruction and delight to see the clean culture and perfect order they were in; trees of thrifty growth, straight and uniform in size and appearance, and moderately loaded with fair fruit, bending the slender branches in graceful curves, so as to open the spreading heads and let in the sun and air to color up the fruit, all through the middle of the tree as well as on the outside; which plan is found to work much better in practice than the *book theory* of heading the trees in like box-bushes, to make them look compact and green on the out side, and exclude the sun from among the branches.

Limbs occasionally split down by the weight of fruit, are not lost, but carefully drawn back to their proper places and fastened with screw bolts, are thus preserved to bear crops in future.

A correct record is kept of all the baskets of fruit and covers sent to market; and credit is given to the salesman for the empties as they are returned. The deficiency, if any, must be accounted for at the end of the season, so that there is no loss in baskets, except those actually worn out. If all fruit growers would enforce the same good rule, their profits would be correspondingly increased. As many of us well know that the loss of baskets in a large operation amounts to a heavy per centage of the profits, by the loose and irresponsible manner in which the empties are returned. So far as peach growing on a large scale is concerned, the net profits may very safely be set down at from $100 to $175 per acre. While in many instances they yield right through from $175 to $250 per acre.

WHAT KIND TO PLANT.

It is important in planting an orchard to have the fruit to ripen in succession through the season, so as not to be inconveniently hurried in getting it to market, yet it is not desirable to have many kinds; nine or ten being sufficient for any one orchard.

Having grown over seventy varieties of peach trees, and found many of them to be of but little value, I have selected the following list, embracing more than enough for one section, yet as several of them ripen near the same time, planters can choose those which do best in their respective neighborhoods, and have a succession of fruit from the earliest to the latest ripening, as follows: Hale's Early, Troth's Early, Mountain Rose, Large Early York, Crawford's Early, Old Mixan Free, Stump the World, Ward's late Free, Harker's Seedling, Late Raripe, Crawford's Late, Beer's Smock, Late Heath Cling and Salway—14.

Upon the conclusion of Mr. Parry's essay, question No. 10 was taken up for discussion, viz: "What can the Fruit Growers' Society do to best encourage fruit culture in Pennsylvania?"

Dr. F. Taylor thought one method of promoting fruit culture in our State was by giving our influence towards the dissemination of agricultural journals. He looked upon the Fruit Growers Society of Pennsylvania as one of the educational institutions of our State, and deserving of ranking in the same category with the free school system.

J. P. Kieffer remarked that a goodly number of agricultural journals were received by farmers in their section of the State, and he thought that agricultural information was coming to be duly appreciated by the people.

T. Meehan said that those who had acquired a taste for the pursuit of horticulture were generally those who had been successful in the growing of fruits. Engendering in the minds of the people a love for the pursuit is, therefore, in his estimation, the best method of promoting fruit culture amongst us.

Mr. A. S. Fuller hereupon offered the following resolution:

Resolved, That we, the members of the Pennsylvania Fruit Growers Society, pledge ourselves individually to add a new member to the society before our next meeting. Passed.

Mr. Satterthwait proposed to appoint a committee to suggest a place of meeting next year. Society voted that the chair appoint a committee of five. The following gentlemen were selected: E. Satterthwaite, Hiram Engle, Hibbard Bartram, H. S. Rupp, D. W. Herstine.

This committee reported Philadelphia as the place of next meeting. The report of the committee was, on motion, adopted.

Dr. Taylor moved that when the society adjourns this evening it be *sine die.*

Mr. Reed hoped that the gentleman would not hasten their adjournment, as our homes were still open to them.

Dr. Suesserott said that the members had been quartered upon the citizens with the intention and expectation of a long session.

The motion that when they adjourned it be *sine die*, was carried by a vote of 18 to 17.

On motion, the Chair now introduced D. W. Herstine, who proceeded to read an essay on the "Grafting of the Grape," prepared by Dr. J. S. Houghton, of Philadelphia.

NEW METHOD OF GRAFTING AND BUDDING GRAPE VINES.

BY J. S. HOUGHTON, PHILADELPHIA.

That grape vines may be grafted with success is a well known fact, but the general results of the practice have not been very satisfactory, and the idea of depending upon grafts for the progagation of vines, has been, I presume, pretty generally abandoned.

I have, however, gathered some information upon the subject from various sources, which leads me to think that the grafting and budding of the vine may be accomplished very successfully by various methods not generally known.

GRAFTING VINES.

And first, as to grafting. The most successful method of grafting with wood one year old, that I have ever seen, was practiced by Robert Cornelius, Esq., of Philadelphia, five or six years ago. His method was as follows:

The scions were cut in the fall, and put away carefully in damp sand, in a cool place. When the grafting was to be performed, the wood was cut into pieces, about the length of one joint—each piece having a well developed bud in the *middle* of the scion. When the joints of wood are bent, and the bud is on the convex part of the bend, it renders the task of grafting must easier and more successful.

The scion is now to be sharpened at both ends, (the bud being in the middle portion) and these sharpened ends are to be pressed into incisions made in the vine, bringing one side, at least, of the bark of scion and stock together, as in ordinary tree grafting. That is, the scion is grafted (or inserted) at *both its ends.*

The stock is bridged, as it were, at the point of grafting. The work is done in the same way, precisely, that the fruit grower bridges up the bark at the base of a young tree when it has been girdled by field mice or rabbits, a well-known practice—one end of a scion being inserted below the girdled spot, and the other end above it, thus keeping up the downward flow of sap through the medium of the scion or scions, over the girdled spot.

As soon as the bridge graft is inserted, or before, Mr. Cornelius placed a tight ligature of wire or strong twine around the vine, at a point midway between the two ends of the seam or graft, to prevent the flow of sap from returning downward through the bark of the vine, and to compel it to pass, in part at least, through the scion, or at any rate to aid as far as possible in forming a good union between scion and stock at the upper end of the graft.

Grafting wax or bandages should of course be applied at each end of the scion, to keep the air from the parts.

The proper time for grafting is, of course, just before the vines start in the spring; and it is better to apply the grafts to wood of same size, say half an inch in diameter, at least.

The bud upon the scion will start very speedily, and grow vigorously, but a perfect union between scion and stock will not be made for several weeks. The lower end of the graft will probably unite first, and the upper end at a much later period.

When the union has been found to be perfect, the upper portion of the vine may be removed, and finally all of the scion except the lower end, where it was grafted, may be also cut off. The abundance of foliage on graft and stock will prevent "bleeding," especially as no cut ends of wood will be exposed until the process is completed.

GRAFTING WITH GREEN WOOD.

Another method of grafting the vine, practiced with much success by Mr. Cornelius, several years ago, was with green wood, in a very ingenious and original manner.

As soon as the vines in the cold grapery had fairly started with growth, Mr. Cornelius put a ligature or band of soft twine around the tip of one of the vines, say about one inch from its terminal point. The object of this band was to obstruct the return flow of sap, and to concentrate the juices of the vine as much as possible in the tip of the cane. This band was permitted to remain on the tip of the vine for four or five days, and in some instances nearly severed the delicate structure of the rod.

The end of the vine was then cut off, to be used as a scion. It was, of course, very green and soft, so much so that Mr. Cornelius said he could roll it up in his fingers, like so much wet paper, into a shapeless mass or ball.

The cut end of the scion was now sharpened, just as in ordinary pear grafting. An incision was then made, immediately *above* and *under* a good dormant bud, on the young wood of a growing vine, where a leaf had already burst into growth. Into this cut was inserted the green scion or graft, bringing its bark in precise contact with the bark of the vine or stock, as in other grafting, and covering the graft and stock with wax or light bandage, in the ordinary way.

This green wood, so grafted, Mr. Cornelius has assured me, will live and grow in the most satisfactory manner, in a very large majority of cases. The failures are as few as in any ordinary tree grafting.

This process of grafting, Mr. Cornelius says, may be performed at any time during the spring or summer, while the sap is running freely enough to form a union between graft and stock. He informed me that on one occasion he grafted a vine with the tip of a Delaware vine in this way, in a cold grapery, and from the extension of the graft in one season he layered, in pots, *forty* Delaware vines! This was at the time when strong Delaware vines were selling at $5 each.

BUDDING WITH GREEN WOOD.

The next experiment in grafting or budding to which I will call your attention was reported in the English horticultural journals a year or two ago. I have mislaid and forgotten the authority.

The report stated that a dormant bud, having a leaf attached about two inches in diameter, could be taken from a young shoot and budded with a growing vine, so successfully that the leaf would scarcely flag.

The precise manner in which this budding was to be performed was not given, except it was stated that a small portion of wood should remain attached to the under side of the bud, the wax and bands should not be too tight, and the bandages should not be removed too soon. In some instances, also, it was said that a portion of the leaf attached to the bud should be cut off to diminish the leaf action or evaporation. The fact that this process had been successful was admitted by several writers, and by the editors of the *Gardeners' Chronicle* and other journals. From more recent information I am disposed to think that this was a sort of *bud grafting*, and not ordinary *budding* by incision in the bark, as in budding peach trees, &c. It is probable that the wood and bark attached to the bud was not placed partly *under* the bark of the stock, as in ordinary tree budding, but rather upon a *cut surface* of the vine, with the sides of the bark of the *bud scion* and the bark of the *stock* or *vine* in contact, as in other grafting.

BUDDING VINES IN SEPTEMBER.

Another method of budding grape vines, which may more properly be styled *bud grafting*, has been practiced very successfully by Mr. Stevens, gardener to the Duke of Sutherland, at Trentham, England. In regard to this experiment I have very precise and intelligible reports.

In this instance the vines were bud grafted with buds taken from well ripened wood, in September, in a cold grapery. I quote from an article in the *London Gardeners' Chronicle*, Oct. 16, 1869:

"To September last, (says the writer,) when Messrs. Lee sent out their first plants of Madresfield-Court vines, Mr. Stevens had one; and, to make the most of it, having a young houseful of nice vigorous Lady Downe's, it occurred to him to bud them with the Madresfield, which was then accordingly done, and every bud succeeded, though a very few were lost afterwards through undoing the ligatures too soon. Further, almost every eye thus budded has produced a handsome bunch of grapes, and made strong rods as thick as one's thumb this season, the stock having been cut away, as in other budding; so that now Mr. Stevens has nearly a houseful of this, the best of all late black grapes, in a fine bearing condition in one season.

"To graft, &c. To graft and inarch vines are not uncommon operations now, but to bud them whilst in this growing state is altogether a new practice, and our thanks are specially due to Mr. Stevens for this discovery. As far as I understand the operation, it is a sort of bud-grafting of the half-ripened wood, the woody portion not being extracted from the bud, as with roses, but left entire, as in ordinary grafting. It is thus simply a joining of the alburnum of the stock and bud, or scion, together; and this it will be seen can be effected at any time after the young wood is firm enough, and before the sap thickens too much to prevent their mingling together and uniting."

As this is a very important matter I will quote an account of this experiment by another writer, which may be found in the London *Florist and Pomologist* for September, 1869:

"While at Trentham a short time ago, (says the writer in the *Pomologist*,) my attention was directed to an experiment which Mr. Stevens had made in the budding of the vine, which was highly interesting, and attended with the most satisfactory results. Strong plants of Lady Downe's Seedlings, were in September of last year budded with well-ripened eyes of the Madresfield-Court Muscat, which remained dormant during the winter. The vines were cut down to the inserted eyes, and in March, 1869, gradually started into growth. The buds burst vigorously, and showed from three to four bunches on each shoot; all, however, were removed, with the exception of one bunch to each vine, and these are now, September, 1869, swelling off surprisingly, and promise to make bunches of from two pounds to three pounds weight. The growth of the vines is healthy and robust, promising well for future results.

"Mr. Stevens called my attention to the necessity of allowing the bandages used for holding the buds in place to remain until growth had well set in, as by removing the ties too soon there would be a liability of the buds being displaced by the pressure of the sap. It is evident that a judicious discrimination must be exercised as to the most fitting time for budding, both as regards the proper condition of the vine and of the bud; and this condition, as it appears to me, occurs in autumn, when the active growth of the vine is subsiding, but is still so far active as to insure a vital union. It is also important to select the best matured buds. I should perhaps add, that the buds were inserted in the older portions of the stems, at about a foot from the ground, so that the buds will do equally well on the old wood as on the young."

The editor of the *Pomologist* mentions the fact, in this connection, that Mr. Fleming, formerly a distinguished gardener at Trentham, advocated the spring budding of grape vines as early as 1851.

The testimony is apparently conclusive that the vine may be grafted and budded or bud grafted with perfect success, and the practice presents numerous important advantages to the fruit grower, which are so evident that it is unnecessary to enumerate them. I trust we may soon have reports of further trials of these processes in America. The grafting with green wood, practiced by Mr. Cornelius, appears to be the most original, striking and useful of all the methods enumerated.

Messrs. Fuller, Meehan, Pierce and others, after the address, advanced opinions as to the most practical modes of grafting trees, etc.

Adjourned till 7 o'clock P. M.

Society met at 7 o'clock P. M., President Hoopes in the chair.

Mr. E. Satterthwait being called upon, read an essay upon "Pears and their Cultivation."

PEARS.

An Address delivered before the Pennsylvania Pomological Society at Chambersburg, January 19, 1871, *by E. Satterthwait, of Jenkintown, Montgomery county, Pa.*

At the request, or to speak more correctly, by command, of our most worthy President, I have prepared some remarks on the subject of pears and pear culture, which are submitted, however, with great diffidence, because, as I must confess, I found the task more difficult than I had supposed it would be. I could very soon have written an article on this subject for the general public that would have been satisfactory, at least to myself if not to the public. But to produce an essay, to be submitted to the criticism of a body of skilled and professional fruit growers, and which must be supposed to be either interesting or instructive to such a company, is quite a different matter. If I have not succeeded in doing this, the only excuse I have to offer is that the task is not of my own seeking, and that I have done the best I could under the circumstances, having been able to snatch but very little time from the cares of business to devote to the purpose.

It would be very desirable, if it were possible, at these our annual gatherings, to be able to present, each year, a statement, setting forth the progress that has been made from year to year, and the exact state of each important branch of the science which it is our object to promote. But from the nature of things this is not possible. Fruit growing, in common with every other branch of horticulture, does not belong to the exact sciences. We cannot in that, as we may with many other branches of knowledge, proceed step by step to add to our stock of information, and by reasoning from ascertained facts, arrive at certain and infallible conclusions. Here, on the contrary, all is vague and uncertain. Not only are there no well settled principles established, but we find the greatest discrepancy existing amongst the most intelligent observers, as to matters of every day observation. And accordingly I find, on taking a survey of the field, an immense mass of crude observations and conflicting theories, a vast amount of which has the tendency only to confuse and discourage the honest enquirer after truth. To attempt to reconcile these conflicting theories—to bring order out of chaos—to sift the few grains of wheat from the many bushels of chaff, would be a herculean task, which I shall not attempt, but shall confine myself to noting such facts and observations as have occurred to me, that seemed to be practically useful; and I shall endeavor to do this without being biassed for or against any disputed theories, but with the one single object in view, to find out the truth.

Taking up the subject in the order in which it is commonly treated, I suppose I must say something in regard to soil and cultivation. On this branch of the subject I shall be brief, as I have had occasion frequently, before this society and elsewhere, to express my views on the subject. In regard to the kind of soil and cultivation most suitable for pears, I have only to say, that the results of my observation and experience are all favorable to "high culture;" I mean by that, bountiful manuring and constant tilling of the soil. In this, as in every other branch of productive industry, I know of no royal road to success. Hence, I have no consolation to offer to those who expect to grow good crops of pears in a grass sod. But I do not propose to argue this question, it is one that has been already sufficiently discussed, and can be determined only by actual experiment.

As it would seem to be proper, however, to give the results of my own experience, I will state, that I give my trees, as a general rule, a good manuring, annually, with stable or barn-yard manure, and cultivate by plowing alternately to and from the trees with a light plow. My trees that have been so treated have thus far generally produced satisfactory crops. It is proper for me to state, however, that I have but few trees that have been planted more than ten or twelve years, which is not long enough to establish any theory conclusively; and it may be that older trees will not do with this kind of treatment. All that I can say at present about that is, that the older my trees get, the better they seem to flourish under it.

I would not be understood as contending that pears will never do well in a sod; on the contrary, I have seen many old and flourishing pear trees, and bearing valuable crops of fruit, too, that stood in grass, or in situations where they could not be cultivated. But these have always been in peculiarly favorable situations; often near the farm buildings, where the drainage from the barn-yard or kitchen found its way; sometimes in city yards where the roots can seek out rich spots of ground under the pavements of gutters, and among sewers and foundation walls; and it must be borne in mind, that the roots of an old tree will run for hundreds of feet, where they find a congenial soil. Pear trees in such situations will often thrive and bear good crops in spite of the grass; but I have yet to see the first pear orchard in grass that was either thrifty or productive.

I am well aware that there are those who are considered high authority, who strenuously advocate the system of keeping a pear orchard always in grass, and when I consider what an easy and common thing it is to slide into the practice of allowing an orchard to become a sod by lack of cultivation, I confess I am not astonished at finding advocates for the practice; but if it was not for the fear of being thought personal, I should be tempted to say, that in many of these cases "the wish was father to the thought."

However, as I have said, success alone must be the test in this question, and when those who practice upon the grass theory show the best crops of fruit, then I also will "go in for grass." For of one thing I am positively certain, that the eternal laws of the Creator will not change, not even to suit the theories of the most wise and astute, and no matter how stubbornly they may be insisted on. A word more in regard to manuring. The pear is unquestionably one of the most hardy, as it is the longest lived of all fruit trees; but it is unreasonable to expect that a tree standing for generations, in one spot, can continue to draw from the same soil, year after year, the ingredients requisite for a large crop of such high flavored and delicious fruit as a fine variety of pear, unless the soil happens to be one of inexhaustible fertility, or has its supply of plant food in some way frequently renewed. It is easy to imagine a tree, (like a pine, for instance,) that produces no edible fruit, to thrive and continue to grow for centuries in a soil apparently destitute of fertility; but the requirements of food-producing plants are different; they require a soil containing more or less of organic matter. Fruit trees, I believe, as much require to be fed as domestic animals do. Everybody, for instance, knows that dairy cows, to yield abundantly, must be constantly supplied with a liberal amount of nutritious food; and I believe this just as necessary for pear trees. I have been speaking now of soils of moderate natural fertility, such as the average soil of Pennsylvania and New Jersey. Of course the same amount of manuring will not be necessary in deep alluvial, or otherwise unusually fertile soils.

The question is frequently asked, whether a stiff clay soil or a light sandy soil is suitable for pears. I cannot answer these questions, but am inclined to the opinion that almost any soil, that is not too wet, will do, if made sufficiently fertile by manuring.

I have seen it frequently recommended to seed down an orchard with clover, and probably this might do well, if nothing but clover would grow; but as every one knows, who has tried the experiment, clover will only live a year or two, and then if the soil is good enough to grow pears at all, a dense sod of other grasses will succeed it; and I know of no way to keep an orchard in clover, but to plow and re-sow at least eyery other year, and this practice, I apprehend, would be liable to all the objections which are urged against constant tillage. Mulching is also frequently recommended, but I have never known it tried to any extent, and I suppose, simply for the reason that it is too expensive.

There is one advantage that I must claim for the system of culture which I practice, that has great weight with me, and must be an important consideration wherever ground is very valuable; and that is, that I get large and valuable crops of other products from my pear orchards—almost the same, in fact, as if there were no pear trees there—the space in the rows between the trees being filled with currants, gooseberries, raspberries, rhubarb, &c., and the rest of the ground planted with other small fruits, vegetables and nursery trees. And it is a remarkable fact that pear trees do not seem to injure other crops growing near them, as apple, cherry and other fruit trees do. Some of my pear trees are now five or six inches in diameter and twenty-five feet high, and yet I cannot perceive that they injure anything growing near them. In fact I am convinced that the protection afforded by rows of pear trees at intervals through the vegetable and nursery grounds is a decided advantage to many things; and as my trees get no manure and no labor in cultivation, except what is applied to the other crops, the pears would seem to be almost clear gain.

I find I have forgotten to say anything about the preparation of the soil before planting, and I confess that I do not attach as much importance to this as is generally done by writers on the subject. I have said enough, I think, to show that I consider a highly fertile and well cultivated soil essential to success, and I certainly should not advise any one to think of planting a pear orchard in ground that was not in a good state of tillage, such as would be necessary for garden crops; but I consider that much more depends on the after treatment than on the original preparation of the soil. And as to deep subsoiling and trenching, I have never found any advantage in it. Soils that are wet, of course, must be drained.

I have already spoken of one prolific cause of failure, to wit—starvation—and I will now proceed to notice such others as have occurred to me. Of diseases of the pear, properly so called, I know nothing, having had no experience with any, unless the premature shedding of the leaves of the trees, otherwise apparently healthy, and the consequent failure of the fruit to ripen, be a disease. Whatever this may be, or whatever its cause, it is certainly the most serious drawback to pear culture that I have to contend with. The mischief from this cause varies with the season and with varieties, amounting sometimes to a total failure of some varieties, and greater or less injury to most others. As nothing seems to be known of the cause of this malady, it will be very difficult to suggest a remedy, and perhaps it is useless to speculate upon it, but, as it seems to be a difficulty of so serious a nature, anything that can throw any light upon it would seem to be interesting. And in connection with this, I will mention what has always appeared to me to be very remarkable and well worthy of the most careful investigation. I allude to the fact that pears grown in cities appear to be entirely exempt from this and every other malady that pears growing in the country are subject to. There would seem to be some mysterious atmospheric influence in cities which is peculiarly favorable to the growth of pears, not only rendering the trees exempt from disease, but causing the fruit of every variety to be free from blemish, and of a complexion so brilliant and perfect as to be recognized with difficulty as the same fruit, when compared with the same variety grown only a few miles distant in the country. This influence, whatever it may be, seems to be entirely atmospheric, as no difference in soil or culture seems to produce the effect mentioned.

In the present state of our knowledge on the subject, the only remedy for this leaf blight seems to be in the selection of such varieties as appear least liable to it. And here I cannot refrain from making a suggestion in regard to a pear, which, from its remarkable vigor and exemption, under all circumstances, from leaf blight, would seem to be well worth experimenting with. I allude to the Chinese Sand pear; and I would like to inquire if any one has ever tried, either by hybradising with other kinds or otherwise, to obtain from seedlings of this variety an edible fruit, with the very desirable properties of this tree. Another serious evil that I have encountered is injury to the trees from severe cold. I have had whole rows of Bartletts either killed outright or so injured as to require years to recover from the effects of an unusually severe winter. There is, of course, no remedy for this, but I have reason to hope that as the trees advance in age their liability to injury from this cause will diminish. In consequence of the injury from severe cold, I have found a northern exposure not desirable for pears, and for the same reason I would recommend protection from winter winds in any way possible.

The apple or quince borer has become very destructive with me of late, and I have lost many fine pear trees by them, the mischief being mostly done before I had made the discovery that the borer would attack the wood of the pear. In localities where this insect is troublesome it will be necessary to take the same precaution with the pear as with the apple or quince to guard against injury from it. This, however, is so easily done that no further mischief ought to result from this cause, when it once becomes known that the borer will attack the pear.

The cracking of the fruit of some varieties, worse some seasons than others, is a very serious objection to those varieties subject to it. As no cause or no remedy has ever been discovered for this, the only way to avoid it is to discard the varieties liable to it. I might say here, however, that I have noticed that the fruit of trees that are unthrifty from any cause, appear to be most liable to crack, and this seems to be another argument in favor of high culture.

The pear seems to be less subject to the attacks of insects than other tree fruits, but curculio and other similar insects are sufficiently troublesome to make a remedy very desirable, if such were possible; and I will repeat here what I have often before urged, that the true remedy for this and most other insect pests, is to be found in the protection, encouragement and domestication of insectiverous birds, and I earnestly advise attention to this subject. I intend myself experimenting with the European sparrow, and I hope others will also.

I have every year bushels of fine pears destroyed by wasps, hornets and yellow jackets eating into them, but I feel satisfied, from the experiments that I have made, that these can be almost entirely destroyed by catching them in wide-mouthed bottles, hung in the trees for the purpose, half filled with vinegar and water.

Before proceeding to consider the question of varieties, it would, perhaps, be better to say what I have to say upon the relative merits of standard and dwarf trees. It will probably be recollected that I, years ago, before this society, expressed my disbelief in the existence of dwarfs to any extent worth talking about; and I have since seen no reason to change this opinion. I long ago discovered that all my quince-rooted trees soon took to themselves pear roots, and abandoned the quince; and though there is probably a difference in soils in regard to it, my belief is that this will always be the case, sooner or later, where they are planted, as is always recommended, with the quince stock all below ground. Some varieties strike root sooner than others. The Bartlett, for instance, will root in a year or two. How pears would do, worked on the quince so high as to prevent them from getting pear roots, I do not know. I have never tried it, for the reason that it would be troublesome to save them from being killed by the quince borer, and I never had faith that they would live or thrive very long. A good deal has been said about keeping trees dwarf by root pruning, and other such appliances, but I presume this is not much practiced in this country, nor will not be, at least not till we get a plentiful supply of Coolies, or some other system of cheap labor.

It will be seen from what I have said that I do not make much account of dwarfs, and in treating of varieties I would be understood as speaking entirely in reference to trees with pear roots. And here I would remark, that I do not find in my own experience the difference that I was led to suppose there would be in some varieties when grown on standard or dwarf trees.

I do not wish to be understood from what I have said as wishing to discourage the planting of quince-rooted pear trees. On the contrary, I think it a very good way of getting standard trees. The habit of bearing they acquire when on the quince seems to stick to them for some time, and is an advantage where it is considered more of an object to have a few pears soon than it is to get trees a few years later large enough to bear a great many. I have thought these remarks on the subject of dwarfs proper, in order to put planters on their guard against the mistake that I was led into myself of planting quince-rooted pear trees too close, under the mistaken idea that they would never get large. I give it as my deliberate opinion, though I know it is not generally admitted, that pears on quince stocks will, in a few years, if they live at all, be found to have nothing but pear roots, and then, if the ground is good enough to grow pears, they cannot be kept dwarfed without a great deal more labor than would be likely to be bestowed on them, so that very close planting, less than fifteen or twenty feet, should not be practiced unless it is with the intention of thinning out in a few years.

An interesting question here occurs to me which would seem to have an important bearing upon the relative merits of pear or quince-rooted trees, and that is whether there is an advantage or otherwise in having the cultivated varieties of pears on their own roots or on the roots of wildlings, as is the case with all standard trees as they come from the nursery. I am unable to throw any light on this question, and it is one that I have never heard discussed. There is at least one disadvantage in the wild stock, and that is its tendency to sucker, which is often troublesome. It might seem probable that the wild seedlings used for stocks would be more hardy and make more thrifty and longer lived trees, but I do not know that there is anything in this. I have never yet observed any difference either in vigor or hardihood.

I now come to consider the most important branch of my subject, the selection of varieties: 'Unfortunately this question is as difficult as it is important. So much has already been said and written upon this question of varieties, that I should feel like skipping it altogether, if it was not that I believe that very many of the opinions that have been put forth on the subject have not been derived from observation and experience sufficient for so difficult a question. It is very common to hear the most decided opinions on this subject urged by those who have had no experience worth mentioning. For my own part I must confess that I feel that my experience is entirely too limited to speak upon it with much confidence.

In considering this subject it must be borne in mind that varieties vary very much with soil and location, and from this cause alone it is impossible to lay down any positive rule; and then there are few localities where many of the numerous known varieties have as yet been fairly tested. From my own experience, extending over about a dozen years, and with about six hundred varieties, I have come to the conclusion that the most skilled and experienced have much yet to learn on this subject; and it seems to me that the proper course in treating of varieties, unless one has had far more experience than I have, is to simply state the results of their own observations with varieties that they have tested, without recommending any, and this is what I propose to do.

In giving my estimate of a variety, I confess that I am goverened to some extent by its value as a market fruit. I do not consider any apology necessary for this, though I know that it is strongly objected to by some. I will say, however, that as it has always been my practice to attend personally to the selling of my own fruit in the market, I have had the best possible opportunity of judging of the relative value of the different varieties for this purpose; and though I am aware that it is very distasteful to some, to recommend a fruit because of its value as a saleable commodity, yet knowing that there are many situated like myself, who follow fruit growing, in part, for a livelihood, and who might be benefited by my experience, I do not feel at liberty to withhold it, and I will here state what, in my opinion, are the desirable properties in a pear for a market fruit. These are good color, size and flavor, and above all it should keep well. I have placed color first, for without this no fruit is of much value for market. A handsomely colored pear, of medium quality, is much more valuable for market purposes than one of first quality that has no beauty of color. Size is of great importance in estimating the value of a fruit for market, not only because large fruit sells better than small, but the time spent in handling small sized fruit is a serious drawback. There are many pears of first-rate quality in other respects that seem to rot the moment they are ripe; these are, of course, worthless for market purposes.

In giving my experience with different varieties, I do not propose to tire your patience by going over a very long list, but shall confine myself to those that are most generally known and recommended, and to such others as I have found, upon trial, to be worthy of particular notice. There are a few varieties of indisputable excellence that are so well known as to need no comments, and are justly considered indispensable in every collection. These are Bartlett, Seckel, Lawrence, Duchess d'Angouleme and Beurie d'Anjon, and since they cover the greater part of the pear season, and are found to do well in most situations, the question will naturally be asked, why not stop here? since to multiply varieties unnecessarily only makes confusion and trouble. Mr. Quinn, in his "Pear Culture for Profit," names these and one or two others, and argues strongly against increasing the number of varieties. While I admit the force of the objection, I must contend that I have found advantages in having a much larger number, and this for several reasons. In the first place, we want early pears, ripening before the Bartlett; and as summer pears last but a short time, it takes several varieties to fill up the season. I do not agree with Mr. Quinn that early pears are of not much account for market. This may be the case where they have to be sent a long distance, but I have found a number of the early sorts quite profitable. The worst time to sell pears, I find, is just when Bartletts are in season, for it is then that peaches, melons, grapes and other fruits are most abundant.

Another advantage in having a number of varieties is, that it seems to be the only way to insure a supply every year; for as the most productive are liable to fail in some seasons, by having only a few sorts, you may miss a crop entirely.

Another advantage I think I have gained by testing a great many sorts is, that I have discovered, by that means, several varieties, not much known, that I think will prove more valuable to me than the most of those that are universally recommended. And besides all this, there is a satisfaction in having a number of sorts, to suit all tastes; "variety is the spice of life," and there is as much difference in the flavor of pears as there is in their shape and appearance, no two kinds being alike.

I propose now to take up the list in the order of their ripening, commencing with the earliest, and treating first of the leading well-known varieties, viz:

Doyenne d'Ete—generally does well; it is of a fine color, good quality and productive, but small, and sometimes cracks.

Madeleine—fair size and quality and production, but does not color well, and soon rots.

Beurre Giffard—one of the finest of very early pears; fine size, first-rate quality and productive, and colors beautifully, but sometimes cracks badly.

Osband's Summer—does well; good color, fair quality and productive.

Manning's Elizabeth—rather small, but first-rate in every other respect; very productive and profitable.

Ott's Seedling—variable in quality, sometimes equal to Seckel; fair color, but rather small; a splendid grower.

Dearborn's Seedling—fine color, fair quality and productive, but too small.

Early Catharine—valuable on account of its vigor and productiveness and good quality.

Rostiezer—productive, but of little value for market on account of its poor color and tendency to rot.

Bloodgood—fair color, size and flavor; productive, but a poor grower.

Julienne—has proven one of the most valuable of early pears, a regular and good bearer, fair quality and size, colors most beautifully, and keeps well.

Tyson—fine size and color, and of the very best quality, but a very poor bearer.

Kirtland—a beautiful russet pear; fair size and quality, productive and a splendid grower.

Of most of the above-named I have had a number of trees in bearing for several years, and will now mention a few others which promise well, so far as can be judged from two or three trees of a kind.

Pendleton's Early York—very early, handsome and good.

Pulsiver—fine color and size; handsome, productive and good.

Jefferson—large and handsome; fair quality.

Muskingum—fine color and size; handsome, productive and good.

Holland Green—of little value for market, on account of its poor color and small size, but of a remarkably high flavor, and productive.

Beurre Benoist—a most beautiful and good pear, of fair size; would seem to be valuable.

Hull—medium size, fair color, good quality and productive.

The above all ripen before the first of September, and are mostly gone before the market is glutted with peaches, melons and grapes, and on that account are more valuable than they would be a few weeks later.

We next come to a season comprising the last few days in August and the first half of September, when varieties of good pears are so numerous, and peaches and other fruit generally so plentiful, that none but the very best are of much account. This is the season of the Bartlett—and it must be a very fine fruit indeed to compete with it—and as a consequence there are many good varieties ripening about this time that are hardly worth mentioning, and I will notice only the most prominent, commencing with the earliest, which ripen about the first of September.

Ananas d'Ete—a fine, large and beautifully colored pear of good quality; valuable.

Andrew—fine size and color; fair quality, but rots too soon.

Cushing—beautiful light lemon color; medium size and first-rate quality; productive and valuable.

Golden Beurre of Bilboa—A most beautiful and first-rate pear in every respect, but the tree appears to be tender and does not thrive.

Doyenne Boussack—this would be a first-rate pear, but it rots so quickly as to be utterly worthless. [Note.—This is one of Mr. Quinn's select few; one of six, I think.]

Beurre d'Amantis—poor color and poor quality, and rots quickly.

Belle Lucrative—good size, of the best quality and exceedingly productive, but does not often color well, and on that account not a valuable market fruit.

Bartlett—of course, stands at the head of the list in its season, being first-rate in every respect, though its peculiar flavor is not liked by every one; and with me the tree has proved more tender than most other varieties.

Steven's Genessee—not satisfactory; tree not thrifty.

Flemish Beauty—a splendid large pear of the very best quality, but does not commonly color well, and rots very quickly; the tree although a very vigorous grower, one of the worst to shed its leaves prematurely.

Ananas or Henry IVth—an insignificant, little green pear of no account.

Washington—a beautiful and first-rate pear, but the tree appears to be tender and does not thrive well.

Onandaga or Swan's Orange—a very large and showey pear of medium quality, very productive, but rots badly.

Howell—a very productive and very beautiful pear of fair quality; a profitable variety.

White Doyenne—always cracks.

Kingsessing—a fine large pear of excellent quality, but does not often color well; a splendid grower.

Beurre Capiaumont—a very beautiful pear and productive, but poor quality.

Des Nonnes—an exceedingly productive and excellent pear of medium size; does not often color well.

Marie Louise—a fine, large and very productive pear, of good quality, and sometimes colors beautifully.

I have given my experience in the above named sorts, because they are amongst the varieties that are most recommended in the books and nursery catalogues, and as I cultivate most of them largely, I have had good opportunity to judge of their merits. I will now mention a few that ripen at the same season, that are not so common, but which seem to do remarkably well, so far as I can judge from a few trees only of a sort.

Boston or Pinneo—very fine; like Golden Beurre, but a more thrifty tree.

Clapp's Favorite—I consider this quite an acquisition; it is a splendid large pear of the best quality, and colors even better than the Bartlett, having a beautiful red cheek; it has, however, a bad fault, it rots too soon.

Ananas de Courtrai—a fine, large and most beautiful pear, of good quality and a regular bearer; would seem to be valuable.

Apothecary—a very large and showy pear.

Gerhard's Butter—a large and very handsome pear, good quality and productive.

Wredow—a remarkably handsome and good pear, but an unthrifty tree.

Westcott—a handsome, good and very productive pear; medium size.

Beurre de Montgeron or New Frederick of Wurtemberg.—The few trees I have of this variety have proved the most valuable of any that I have. It is the most beautiful pear I ever saw; size from medium to large, very uniform in size and shape, quality generally good; most remarkable for coloring uniformly with a brilliant red cheek, and remaining for weeks this way on the tree—a most beautiful sight. It has always proved to be a very regular and good bearer—tree, thrifty and vigorous. A large dish of this variety that I had on exhibition last fall, at the exhibition of the Pennsylvania Horticultural Society, attracted far more attention and was more admired than any out of the three hundred varieties I had on exhibition. Its season is a little later than the Bartlett.

We next come to a season comprising the latter part of September and the remaining fall months, when pears are far more valuable than they are at the height of the peach and melon season.

Seckel—stands at the head of the list at this season on account of its remarkably high flavor. It unquestionably has no superior in this respect. It is not however a very valuable market fruit, on account of its small size and generally poor color, and tendency to rot before ripening.

Louise Bonne de Jersey—has not proved satisfactory; it bears abundantly, but often of poor quality, and sometimes cracks.

Buffam—a very productive and profitable variety; the tree is remarkable for its vigor and beauty of growth. Though rather small and not of the highest flavor, its fine color and productiveness make it a valuable market fruit.

Urbaniste—has generally proved good in every respect.

Duchesse d'Angouleme—does wonderfully well some seasons, but has not proved a regular bearer, probably from being allowed to overbear. [Note.—I think it would pay well to thin out the fruit of this and perhaps also of many other varieties when the trees are overloaded.]

Beurre Diel—has not proved satisfactory—it is sometimes first-rate, but generally of a poor color and sometimes cracks.

Dix—remarkable for being the only sort out of five or six hundred that never bears; I have a number of quite large trees of this variety, one of them more than twenty years old and nine inches in diameter, and they have never borne a dozen pears.

Napoleon—very productive, of a good color, but often spoiled by being spotted with a sort of mildew.

Oswego Beurre—productive, but often cracks.

Beurre Superfin—a splendid large pear of excellent quality, does not color well and rots too soon; a very handsome growing tree.

Sheldon—generally does well, productive and good, but sometimes cracks.

Beurre Bosc—a very fine, large, handsome, productive and good pear; one of those sub-acid pears that are preferred by many. It seems to have one fault, however, that I think is common to all dark russet pears, that of rotting badly before ripening.

Paradise d'Automne—very like Beurre Bosc, but smaller and seems to be no better in any respect.

Beurre d'Anjou—has proved first rate with me in every respect; I consider it one of the most valuable of all pears.

Beurre Clairgean — a very large, showy and productive pear, of poor quality and very liable to be spotted with mildew, and often drops prematurely from the tree. (Note.—Another one of Mr. Quinn's pet varieties.) Some of the above varieties will sometimes keep half-way through the winter. They are all from among the sorts in common cultivation and such as I grow largely.

I will now name a few others ripening at the same season, that are not so well known, but have proved valuable with me. I have not, however, grown many of them extensively.

Doyenne de Fais—exceedingly productive, good quality, valuable for keeping long after it has become yellow.

Doyenne Rose—a beautiful and productive pear; also keeps well after it has colored.

Oswego Incomparable—a fine, large and beautiful fruit, keeps well after it has colored—tree a splendid grower.

St. Michael Archange—a large, handsome and good pear—tree, a most beautiful, erect and vigorous grower.

Baronne de Melo—a very handsome dark russet pear, of good quality and productive.

Philip Goes—very much like the preceding.

Bezi de Quassoi d'Ete—a beautiful and very productive pear, good size, and first rate quality; appears to be quite a valuable variety.

Surpasse Virgalien—almost equal to White Doyenne, and does not crack.

Rutter—a splendid, large and exceedingly productive pear, of first-rate quality, very remarkable for bearing enormous crops from the time the tree is first planted, and the tree all the time making the most vigorous growth. It is also an excellent keeper. I consider this a fruit of great promise.

We come now to winter pears, not having paid as much attention to the ripening of these as I might have done. I do not remember but a few varieties that I think worth mentioning here. I have quite a number, however, on trial, some of which I am in hopes will prove valuable.

Lawrence, without dispute, stands at the head of the list of early winter pears, and probably, taking all things into account, it is the most valuable of all pears. It is not, however, a late keeper, and frequently commences to ripen the first of October. It has done with me exceedingly well.

Winter Nelis—a good early winter pear, does not keep late.

Doyenne d'Alenson—very productive and sometimes very good.

Vicar of Winkfield—very productive and valuable as a market pear for cooking; has never been anything more than this with me.

Easter Buerre—productive and sometimes very good, but does not generally ripen well.

Glou Morceau—sometimes first-rate, does not often do well—a splendid growing tree.

I shall not trespass further on your time by extending this list, though I might have mentioned many others that I have on trial that I consider well worthy of attention, quite a number of them having done better for me than the majority of those on the lists generally recommended for cultivation.

If I had been writing a book instead of only an essay, I should have treated this branch of my subject with more minuteness and at much greater length, but knowing how exceedingly tiresome and uninteresting these dry details must be to all but the very few who, like myself, have made this a speciality, I feel that I owe an apology already for having extended my remarks beyond the limits proper for an occasion like this, and I shall, therefore, be compelled to omit a number of minor topics and some of more importance, such as planting, pruning, gathering, ripening and marketing the fruit, all of which would have been interesting in a more extended treatise.

Before concluding, however, I desire to reiterate that it was not intended that the foregoing remarks should be taken for anything more than what they really are—the views and opinions of a single individual. In preparing them I have consulted with no person and have looked into no books or authorities on the subject. Had I done so, I could have compiled a treatise that would, doubtless, have been entitled to more weight and consideration. But I did not suppose that that was what was required of me. I understood my instructions to be "to give my views on the subject," and what I have done is, at least as far as it goes, emphatically just this: "What I know about pears," and for that let it be taken.

One word more, in conclusion, in regard to the general subject of pomology. At the commencement of my remarks I hinted at the difficulties there were to contend with in the advancement of this science, and while it is undeniable that in our attempts to investigate the hidden secrets of nature in this direction, we are met at every step by the most discouraging obstacles—that those of us who consider ourselves the most practical and the least likely to be carried away by subtle and plausible theories, find ourselves constantly at fault and often compelled to turn back and take a new departure. But while admitting all this I do not wish to be understood as taking a discouraging view of the situation. On the contrary, I see much to encourage and stimulate us to future efforts. That pomological science is making rapid progress, in spite of all obstacles, does not admit of a doubt; but I should be traveling entirely out of my province to speak of that here. It is these very difficulties, when viewed in their proper light, that are in reality the greatest stimulus to exertion. It is wisely ordered that the road to success in every useful and laudable pursuit is beset with difficulties. If it were not so there would be little to stimulate to that exertion and industry which develops the higher and nobler qualities of our nature; the ignorant and the slothful would be equally successful with the industrious and the skillful. Pomology is so far from being a perfect science that those who have made the greatest progress in it must admit that they are only beginning to see how much there is to learn. There is every inducement, then, to persevere in the good work, and if we do this properly, and actuated by motives that are higher than merely selfish considerations, and in that spirit that loves the truth for its own sake and above everything else, we will surely have our reward. And not only will these meetings continue to be an annual source of agreeable recreation and pleasant social enjoyment, but we will have the far greater satisfaction of beholding our efforts successful in assisting in the advancement of a science which is behind no other in practical usefulness, and in the benefits it confers in improving the health and happiness of our race.

Mr. Engle offered the following resolutions, which were adopted:

Resolved, That this society return its most hearty thanks to the Franklin County Horticultural Society for the friendly and cordial reception given to the members of our society.

Resolved, That the most grateful acknowledgments are hereby returned to the families of Chambersburg and vicinity, who have so hospitably entertained the members of the Pennsylvania Fruit Growers Society during its sessions here.

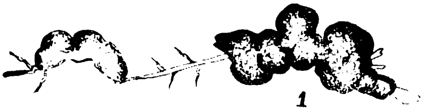
Resolved, That this society very highly appreciates the attendance and interest shown by the people of this town and vicinity during its sessions at this place.

S. S. Rathvon next read an essay upon "Insects injurious to the Apple."

INSECTS INJURIOUS TO THE APPLE.

BY S. S. RATHVON, LANCASTER, PA.

There is no fruit cultivated in the United States, at least none north of "Mason and Dixon's line," that has established itself more deeply and firmly in the heart of popular favor than the *apple*. And this, perhaps, is *justly* so; for, under favorable circumstances, no fruit is more easily cultivated, none that yields such a prolific return to the fruit-grower, none that is more hardy and can bear with greater impunity the rigors of our often severe and changing climate, and none that retains for a longer period its lucious and edible qualities. Nor is there any other fruit cultivated in our latitude that can be successfully applied to so many culinary purposes, none which is so grateful to the human palate in all its forms of use, from the simple, unprepared fruit, up through all its grades of preparation, to the highest and most sublimated jelly. The apple, among us, is the first fruit whose form is impressed upon the mind of childhood; and its very *name*, beginning, in the English language, with the first letter of the alphabet, is about the first among our fruits which a child learns to pronounce with distinctness enough to be understood. Indeed the name, compared with the names of other fruits, seems to be so easily acquired by the child that it often applies it indiscriminately to nearly all other fruits of a similar form, whether they be apples, pears, quince or peaches. It is true, that seeing apples from the middle of July almost until its annual return, it has opportunities of becoming more familiarized with it than with other fruits, most of which only obtain for a short season; but this very characteristic, and the general healthfulness of the fruit, enhances it the more in the estimation of every judicious house-keeper, and renders its degeneration or failure almost a do-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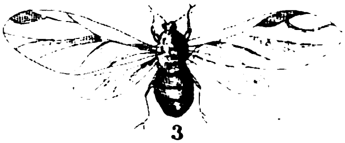
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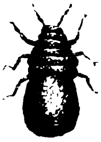
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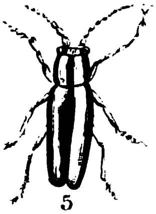
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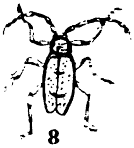
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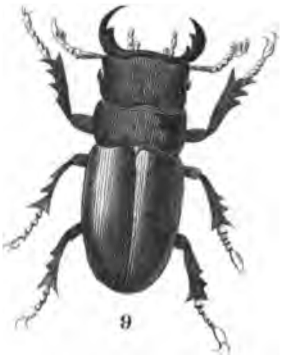
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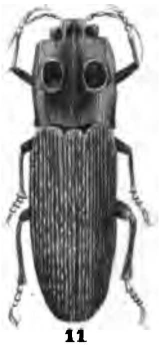
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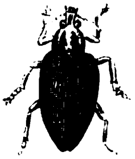
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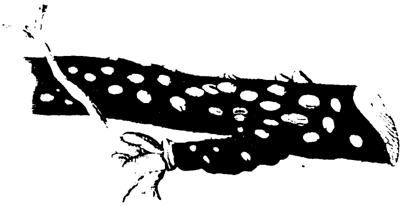
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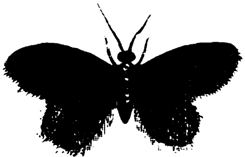
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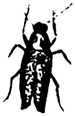
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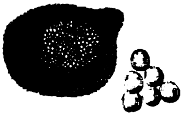
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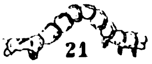
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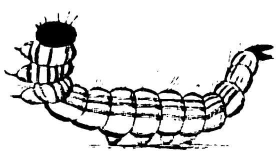
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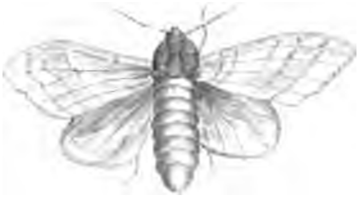
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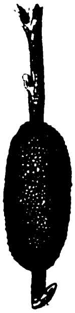
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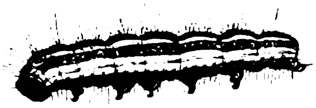
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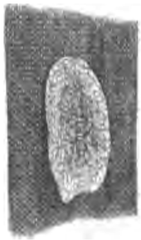
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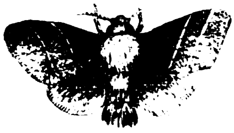
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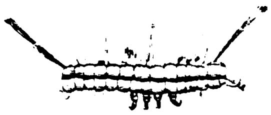
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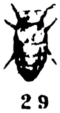
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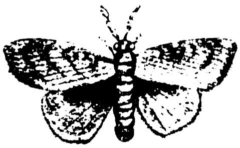
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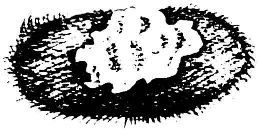
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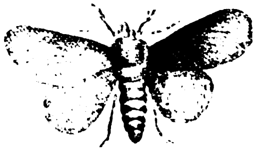
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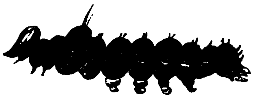

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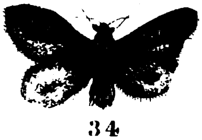

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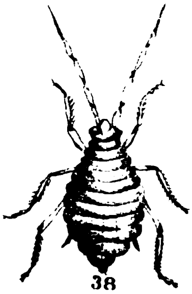

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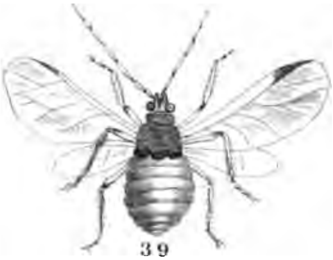

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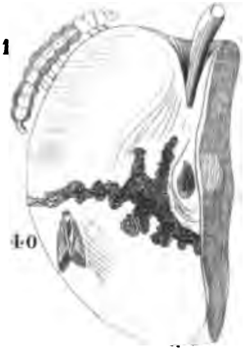

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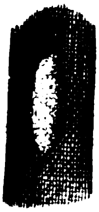

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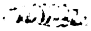

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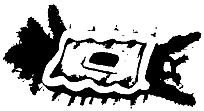

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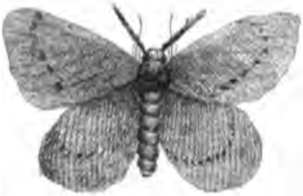

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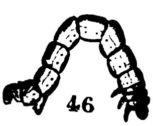

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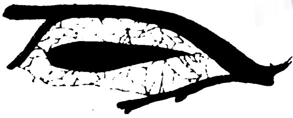

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mestic calamity. Happily for us, however, our increasing railroad facilities, and the solid texture of the apple, renders its transportation from localities in which it is abundant to those in which there has been a failure of the fruit, a matter of easy accomplishment, and at prices remunerating to the producer, and within the means of most consumers.

Like all other fruits, the apple has many drawbacks to its successful culture; some of which are doubtless unknown; some climatic and others due to the infestation of various species of insects. Perhaps continued cold, dashing rains at the period of fertilization, winter freezing or exhaustion of the soil may be more detrimental to the apple crop than the infestation of insects, but in many localities, and under many circumstances, this latter *cause* is a most damaging one. So long as there are apples enough for us and the insects both, we are in the habit of paying little heed to them. It is only when the crop is small, and insects are likely to injure or appropriate that which has escaped other casualties, that we become alarmed at their presence. Leaving the discussion of other causes to those of larger experience, and therefore greater competency, I propose to confine my remarks to the illustration of some of the most prominent *insects* that are injurious *to the* apple crop.

These may be classified into those insects which attack the roots, the trunk, the branches, the leaves and the fruit, and although when present in moderate numbers, and in prolific fruit seasons, some of them may perform an important service to negligent growers, in thinning out the fruit where there is a superabundance, still they are not to be regarded at all as benefactors, and their ways should be found out, their depredations circumvented, and we should learn to regulate the quantity of fruit on our trees by some safer means than such doubtful contingencies, or we may, in the end, be entertaining an *elephant* unawares.

This classification of these insects is, however, merely an economical and not at all a scientific one, for each of these classes contains individuals which belong to distinctly different natural *orders* and *families*. But it is more convenient, and figuratively at least, more progressive, to begin at the roots of the tree and proceed upwards towards the leaves and fruit, although we may have to *alternate* between *orders* and *families* as we proceed. And allow me here to say that the study of *orders* and *families* in entomology is an important one, for it allows the student, of limited time and means, those opportunities to generalize and analogise, without which it is impossible to condense the subject within the comprehension of those who are unable to make its details a specialty. If, from its form and structure, we know to what *family* to refer an insect, we may be able to form some idea of its history and his habits, even though we may not have witnessed any of its depredations, and this is to some extent the same in reference to *or-*

ders. The modes and manners of life, and the organic structure of insects differs so much between *larva pupa* and *imago*, that without this knowledge we should never be able to locate an individual, or identify it when we found it in any of these States. From its structure we may know whether an insect is masticatory or suctorial in its habits, and therefore the nature of the injury we are likely to sustain from its depredations. From its form, among *masticatory larva*, we ought to know whether it is predaceous in its habits or whether it is a wood-borer, a leaf-eater, a root-feeder, a carrion-consumer, a cut-worm, a meal-worm, &c. This knowledge would enable us in some measure to distinguish between our friends and foes; what we ought to destroy and what we ought to permit to live, as helps in our warfare against the noxious kinds.

INSECTS INJURIOUS TO THE ROOTS.

As the root of a tree or plant is a most important organ, and its functions being essential to the health and thrift—we may say to the very *life* of it—and as the fruit grower's anxiety to have a good root, is equal to his desire to have a good place to plant it in, I therefore propose to commence my specific remarks, in noticing a few insects which sometimes infest this fundamental organ of the tree.

The most widely extended in its operations is the "apple-root blight," *Eriosoma pyri*, of Dr. Fitch. This insect belongs to the order *Homoptera*, which includes the "seventeen year locust," the "tree-hoppers," the "plant lice," &c.—and to the *Family Aphididæ*, or aphids. These insects form tubercles, (fig. 1,) or warty excresences, on the roots of the apple, especially on young trees in the nursery, and most especially on those growing in moist, slaty, or clayey soil. Their mode of propagation is probably similar to that of aphids in general—that is, they produce successive generations without refecundation; the sexes coming forth in a winged condition once a year, at the end of the season; and then, after the deposition of their eggs by the females, dying, and the young commencing their work the *following* season.

The eggs of these insects, and even the young themselves, are too small, singly, to be detected by the naked eye, but when massed together, and, covered as they are, with a whitish floculent substance, they may be plainly seen. A single individual may also easily be seen, when they are full grown, especially the male, (fig. 3,) for his length, to the ends of his wings, is then nearly a quarter of an inch. I should have said before, that the female (fig. 2) is wingless. When divested of their floculent covering, the color of these insects is black; the abdomen being a dark, dull, greenish color; the wings are transparent, but not so clear and glassy as in some other species of aphids; and near the end of the anterior pair, on the costal margin, is an oblong, dark, smoky spot. This insect attacks the roots of the pear, as well as the apple, and I have often found, either these, or allied species, on the roots of *different* plants, but all such plants had an exhausted or sickly appearance. Probably very large, healthy, and deeply rooted trees, would suffer them with impunity; but it is not in such cases that they have been complained of, but in small, recently planted trees, and especially nursery stock. Mr. J. Fulton, of Chester county, in a communication to Mr. Downing, called his attention to the existence of these insects on apple roots as early as 1848, stating that in taking up his trees he found the roots full of these excresences, and that they were covered over with minute white wooly insects, and that the nursery stock became scarce that year, from the fact that thousands had to be thrown away from this cause. It has, however, since been demonstrated, that if not too much exhausted, young trees infected by these insects will recover, if the excrescences are removed, and the roots immersed in a strong soapy solution before they are planted again. Wood ashes thrown in around the roots, when the trees are being planted, will have a similar effect, and I presume a diluted solution of carbolic acid would also be good. No doubt these insects are carried from one locality to another on the roots of trees being delivered in the fall and spring, when only the eggs are there, and these are too small to be seen by the naked eye. Therefore, such an immersion as I spoke of, would be a good precautionary measure in any case; for, after these insects are once located, it is almost impossible to extinguish them, without subjecting the trees to further injury in attempting to clean their roots after they have been planted, and the presence of the insect is suspected or known.

Whatever the "seventeen year locust"—*Cicadæ septendecim*—may feed upon in its earliest larval stages, and whatever may be its subsequent aliment during the long period it passes beneath the surface of the earth, it is certain that it has been found, on various occasions, adhering, in numbers, to the roots of trees, and among these trees, those of the apple and the pear. Therefore, an apple tree whose branches have been punctured by these insects, after the young are hatched and go into the ground, must afford them sustenance during the larger portion of the seventeen years which they pass in the *larva* state. The late Miss Margaret H. Morris, of Germantown, Pa., says that on removing the earth from a pear tree in 1847, that had been declining for several years, without any apparent cause, she found the *larvæ* of the *Cicadæ* "in countless numbers" clinging to the roots of the tree, "with their suckers penetrating the bark, and so deeply and firmly placed that they remained hanging for a half hour or more after they were removed from the earth." In the spring of 1860, Mr. J. Zimmerman, of Lancaster, brought me half grown larvæ of the *Cicada*, which he had previously exhumed in digging and pulling up a small apple or cherry tree in his garden. It is true this may have been a *C. Pruinosa*, but as *C. Septendecim* had been in his garden in 1851, the inference is that it was the latter, particularly, as the former is an annual insect, it would be likely to be much larger than this individual in the month of May, when I received it. These insects are very local in their habits. They crawl up the first object they meet after they come out of the ground, and if it be a tree, there they also deposit their eggs, and there also they die—for the most part—and there, too, the young, when hatched, go into the ground. It is probable that these insects may be inflicting our trees in many cases we know not of, or are assigning to various other causes.

INSECTS INJURIOUS TO THE TRUNK.

Perhaps the most destructive enemy to the *trunk* of the apple tree, is the *larva* (fig. 4) of *Saperda bivittata*, or the "Striped apple tree borer," as it is familiarly called. This insect belongs to the *Order Coleoptera*—which includes the "Beetles"—and to the *Section Longicorniæ*, or long horned beetles. It is the typical genus of the *Family Saperdidæ*; the *larvæ* of this whole section being "wood-borers." There is probably no insect whose history has been more often and more fully ventilated, and yet there are many people who are unable to recognize the mature insect, and nearly as many, perhaps, who do not know anything about its history and habits nor the periods of its appearance. It is only in the larva or grub state in which it is so destructive to the trunks of the apple trees—especially to young trees. When the tree becomes very large, it can afford to tolerate a few of these insects with comparatively little or without much apparent injury. It usually makes its appearance in the beetle state, (fig. 5,) in and throughout the month of June—sometimes in July. It is then about three-quarters of an inch in length, and has two whitish stripes on the back, extending from the head to the end of the abdomen, and three brown stripes of the same length, the central one being usually of a darker color than the lateral ones. The *antennæ* in the males are longer than the body, and in the females not quite as long as the body. During this period—that is, during the months of June and July—is the proper time to guard against the propagation of these insects, for this is the propagating period, and they are then solely occupied in effecting this end. After the female is fertilized by the male, she seeks the base of the apple tree as the favorite spot to form a nidus for her eggs, and these are deposited in the little crevices, as near as she can possibly get them, to the vital parts of the tree. The eggs are small, oblong, yellowish white objects, about the size of those of the "Canker worm," which I exhibit on this occasion, but longer. As soon as these eggs are hatched, which is usually a week or more after they are deposited, the young larvæ bore into the tree, and remain under the bark for a whole year.

In the meantime the small apertures through which they have entered close up; and, except when the trees are young and tender and the bark smooth, their presence in many cases cannot be readily detected. It is only the second year, when they begin to bore into the solid wood of the tree, and also make a hole out to the surface through which their castings protrude, that their presence becomes prominently visible. The third year they work themselves still deeper into the wood of the tree, and both these years their course is upward. Sometimes they may be found from twelve to eighteen inches or more above the surface of the soil, but their earlier periods are from an inch to three or four inches below it, but oftenest just at or beneath the surface. At the end of the third year they bore transversely towards the outer surface of the bark and change to the *pupa* or *chrysalis* state, and wait there for the proper time to issue into the light of the outer world. When the larva has reached maturity, it is a dirty white footless grub, (fig. 4,) about one inch in length, with a small brown head, and twelve very distinctly marked segments, the first one being the largest. The head is armed with a pair of short, stout and sharp jaws, and retracts into the first segment. The body tapers gradually in circumference to the tail, but the middle segments are the longest, and the terminal one quite small. These grubs, however, vary much in size, for I have seen them nearly an inch and a-half in length. During the period when the mature beetle comes forth, the dust or cuttings will be found around the holes they bore through the bark, and at the base of the tree; and sometimes people only become aware of their presence when they see this, and forthwith proceed to "lock the stable door after the horse has been stolen"—it being then too late to catch the thief.

Many are the remedies which have been suggested for the destruction of this insect—some good, some bad and some indifferent. While they are just beneath the bark they may be gouged out with a knife or a chisel, but after they have penetrated the wood a steel wire, with a sharp point and barb at the end, is necessary to dislodge them or kill them in their burrows. Some people heat the wire and roast them to death. The best remedy is to prevent the female from depositing her eggs on the tree, and this may be effected by protecting the base of it during the months of June and July. No matter what the contrivance is, whether sheet-iron, tin, stiff paper, leather or old rags, so that it is applied at the right time. Driving spikes and nails into the trees, or boring holes into them, and filling them with sulphur, calomel, arsenic or any other substance, is altogether useless. Sometimes there may have been results which seemed to imply that these remedies had been effectual, but I am satisfied these effects have resulted from other causes. Some scrape out the wounds, and draw the earth away from the trees, and leave the roots exposed for weeks and months; but if this is done during the months of May, June and July, it only exposes the trees, and invites the females hither to deposit their eggs. Others, when so exposed, apply lime, ashes, alkalis, salines, soaps, narcotics, &c., and although each of these may do some good, if properly applied and at the right time, yet *prevention* is anterior and superior to them all. These remedies, as well as the dry exposure, may assist in destroying the eggs after they are deposited, or kill the young grubs after the eggs are hatched, for they require some moisture for their development, and either a hot sun, dry air or dry lime or ashes, may absorb this necessary element and defeat the insect, if it reaches the objects intended to be effected at the right time, for, after they have penetrated the solid wood of the tree, it must be evident that no applications of these kinds would be of any avail in dislodging them. But this insect enemy confines its operations to the *base* of the trunk of the tree, and it must surely be regarded as a fortunate arrangement in the economy of nature, that the roots and the base have so few enemies, or they might have a more fearful gauntlet to run than they have under existing circumstances.

The next most prominent enemy to the *trunk* of the apple trees is the "apple-buprestis"—*Chrysobothris femorata*, of Fabricius, (figure 6.)—This is also a *Coleopterous* insect, and belongs to the *family* BUPRESTIDÆ, which is included in the old group or section named SERRICORNIA, from their "serrated" or saw-tooth like *antenna.* The larva of this insect is a pale yellow footless grub, (figure 7,) with its anterior end very much enlarged, giving it something the form of a horse-shoe nail. This insect is much smaller than the striped borer, but it also excavates a cavity under the bark of the tree and in the solid wood thereof, confining its operations, however, to the upper part of the trunk and the larger branches. This insect also attacks the pear, and sometimes also the peach tree and cherry tree, and causes the oozing of the gum found on the latter. The mature insect comes forth from the middle of May to the middle of July, and is then a small, flattish, greenish black "beetle," about half an inch in length, and of a bronzed or metallic lustre beneath, and may often be found basking in the sun or flying about the trunk or branches. Its native tree is supposed to be the white oak. Cutting out the *larva*, and entrapping the *beetle* in any way most effectual, are the only means that can be resorted to for the extinction of this insect.

Another member of the "long-horned" section or group, but belonging to the *family* CERUMBYCIDÆ, which infests the trunk of the apple tree, is the "Prickly Leptostylus," *Leptostylus aculiferus*, (figure 8,) of Say. The larvæ of this insect is a small whitish grub, similar in form to the striped borer, but hardly more than one-fourth its size. It confines its operations beneath the bark, and sometimes is found there in vast numbers, forming long winding tracks on the outer surface of the wood, the evidences of which can sometimes be seen on the surface of the bark, which becomes loosened. These tracks become broader as the grubs increase in size; and although they are capable of doing a great deal of injury, when they are numerous, yet fortunately there are often long intervals in which very few occur. The beetle appears about the middle of August, and is about one-third of an inch in length, and of a brownish, or brownish gray color, with small prickly points on its wing-covers, and is distinguished by having a pretty long pair of *antennæ*, or horns. Many of the *larvæ* of this insect, as well as of the *Chrysobothris*, are dislodged and devoured by the various species of woodpeckers which visit apple trees, and especially by that little individual so well known to the boys, and, by way of distinction, called the "sapsucker." In my boyhood we were instructed to stone these little friends away from the trees, on the ground that they were sucking out the sap, but it is curious that these birds resort to the trees mostly during the fall and winter, when one would suppose there was least sap to suck. Perhaps boys, in some localities, may be still so instructed, but it does not require much encouragement to induce them to do so, for the bump of destructiveness is developed so largely in some boys—as well as in some men—that they look for a stone, as if by instinct, as soon as they get their *eye* on a bird.

There are two small "Apple-bark beetles," or "Blight beetles," belonging to the *family* SCOLYTIDÆ, which infest the trunk and branches of young apple trees in the early part of the season, and later the smaller *twigs* and branches, which seems to indicate that there are two broods of them in a year. The one is *Tomicus mali*, of Fitch, and the other *Scolytus pyri*, of Peck; the latter of which, from its name, was thought to confine itself to the *pear*. These little insects sometimes perforate the bark of the young growing trees, in vast numbers, by boring small holes, not much larger than a common pin-hole, through which they emerge to the outer world, having passed their larval periods beneath the bark, or in the solid wood. The mature insects are from a ninth to a tenth of an inch in length, are cylindrical in form, and of a black or dark chestnut color, with the legs of a lighter brown or yellowish color, and have short knobbed *antennæ*. The second broods attack the young twigs during the summer, penetrating them, and causing the leaves to wither, producing that peculiar appearance called *blight;* but a similar blight often occurs where no insects are present, and must, therefore, be the effect of some other cause. Under any circumstances, it is best to cut these withered branches off and burn them, for, as these insects are concealed, there are no other means by which they can be destroyed. The first brood issues forth in the beginning of July, the larvæ of which have probably remained in the trunk and branches during the whole winter. The first named insect is known to have been very numerous and very destructive in some of the eastern States. The last named also attacks the small branches of the *pear*, the *plum* and the *apricot*, generally depositing its eggs around the buds, the *larva* penetrating into the wood where it undergoes its transformations, and re-appears a mature beetle.

When apple trees become old and partially decayed, there are a number of other psuedo wood-boring insects, the larva of which feed upon the dead wood, some of them remaining in the larva state five or six years; but as they are not the *cause* of the decay, although they may hasten and increase it, it is not necessary to do any thing more than to refer to them very briefly. Conspicuously among these are the larva of a "horn bug," *Lucanus dama*, (fig. 9)—a large, smooth brown beetle, with prominent jaws; the "Rough Osmoderma—*Osmoderma scabra*—and the "Smooth Osmoderma"—*Osmoderma eremicola.* The larvæ of these three beetles are large, thick and nearly cylindrical, white worms, (fig. 1(,) with the abdominal or *anal* segment quite large, and bent downward and forward, in the form which characterizes all the larvæ of LAMELLICORNIA, or laminated horns—the great division of the *order* CALEOPTERA, to which they belong. These larvæ form large hard pods out of the woody cuttings in the hollow parts of the trees, in which they pass the pupa state, and the mature insects appear during the warm weather in June and July, sometimes entering houses through the open windows in the evening. In addition to these, there are three species of "snapping beetles," which infest decaying apple trees, namely: *Alaus occulatus*, (fig. 11,) *myops* and *luscus;* but the first named is the most numerous, and therefore the most common. The larvæ of these *snappers* are long, smooth, flattened, tawny yellow worms, either a dark brown or nearly black at each end, the largest being sometimes two inches and a half in length. The anal segment is armed with two spines curving upward, and on the underside is a single, soft, retractile proleg. The perfect insect of the first named is a long, flattened beetle, black in color, but profusely speckled with white, and has two black eye-like spots on the thorax, from which it derives its specific name. The second is similar in form and color, but the spots on the thorax are much smaller, and the third is without the white, or the thoracic spots.

INSECTS INJURIOUS TO THE BRANCHES AND TWIGS.

The small branches, or twigs, of the apple tree are often infested by a little mining insect belonging to the *order* COLEOPTERÆ, and *family* BOSTRICHIDÆ, called the "apple twig borer," *Bostrichus bicandatus*, (fig. 12.) This little insect makes an excavation through the heart of the twig, about the size of a knitting-needle, causing the leaves to wither and turn brown in midsummer. This insect is a small, chestnut-brown, cylindrical beetle, having a family alliance to the SCALYTIDÆ—before alluded to—and resembling them in form; but it confines its operations to the *twigs*, so far as known. It derives its specific name from two little spines, or points, which it has at the end of the wing covers. This insect is also called *the* "blight beetle," and this circumstance is only one among thousands which elucidate the absolute necessity of Latin terms in insect nomenclature. The remedy is to cut off the twigs as soon as the leaves are seen to wither, and burn them. This can easily be done with pruning shears attached to the end of a pole, and made for that purpose. Another Coleopterous insect, injurious to apple twigs, is the "New York weevil," *Ithycerus novæboracenis*, of Forster, (fig. 13.) It belongs to the great *Curculio* section, one member, at least, of which has become notorious over our whole country as the great enemy of the plum, the cherry, the peach, &c. This is the largest insect of its tribe that we have in the northern and middle States. It attacks the buds and tender shoots in the spring of the year, and in New York and some of the western States has been very destructive, but not yet, to any great extent, in Pennsylvania. The largest specimens are over half an inch in length, and are of a gray color, having four white lines, interrupted by black dots on each of the wing covers and three on the thorax. I have found it frequently in Lancaster and adjoining counties, but I have not not yet been so fortunate as to have found the *larvæ*, (fig. 14,) but according to an account in the *American Entomologist*, Vol. 1, it is said to breed in the branches (fig. 15) of the bur-oak, and, perhaps, in the pig-nut hickory. Why not also in the branches of the apple, where the mature insect is so often found? The female punctures the branches of the oak, &c., and thrusts in an egg. If, therefore, the proper attention was given in the spring, when these insects appear on the apple trees, it might be discovered whether the larvæ are bred there or not.

Perhaps the worst enemy to the smooth branches and twigs of the apple tree we have is the "apple bark louse"—*Aspidiotus conchiformis* of Gnèlin, (fig. 16)—which means "oyster-shell bark louse," because the insect is something in the form of a shell of that kind. This is an imported insect, and is far worse than our native species, *Aspidiotus Harrisii*, or "Harris's bark louse." This is an oblong, flattish, brown scale, about one-eighth of an inch in length, which attaches itself to the smooth and tender bark on the branches, sometimes so crowded together as to entirely cover the bark. These scales are all females, and beneath each of them will be found a number of small white eggs, which hatch out in the spring of the year, sometimes about the end of April or beginning of May and throughout the latter month, according to latitude or the temperature of the weather. When the little lice come forth, which they often do to the number of twenty, forty or sixty, sometimes even a hundred, from a single scale, they are merely minute atoms, having a beak, six feet and a pair of antennæ, dispersing themselves over the branches. The males acquire wings in a few days, and then resemble very minute "midges," and after fertilizing the females they soon die. But the females become stationary and insert their beaks into the bark and suck out the juices of the branches. These females gradually become degraded, loosing all their limbs but the beak, and as the season advances become overspread with a bluish substance resembling mould. As this mould wears off, later in the season, the shell-like scale becomes exposed, covering the eggs, which are thus protected until the following spring. These scales are nothing else than the dried bodies or cast off skins of the females. Of course where these insects are numerous, they must necessarily exhaust and finally destroy the trees, or at least render them worthless. Applications of oil or grease are considered the best remedies, in all respects, that have yet been tried for the removal and destruction of these insects.

A better remedy, however, for the destruction of this insect is found in its native enemy, a little chalcideous parasite—*Aphilinus mytilaspidis*—L. B. Dr. Le Baron, of Geneva, Ill., has devoted much attention to the study of this little insect, and as the "oyster-shell bark louse" seems to be quite abundant in his locality, he has opportunities to investigate it which I have never had; for, fortunately, this *bark louse* has not been as numerous and as destructive in Pennsylvania as it has been in some other States. Dr. B. says, that in 824 of the scales examined, which he had collected in Kane and Du Page counties, Ill., 533 were destroyed by this "chalcis fly;" 234 had been destroyed by *acari* and unknown causes, and that only 57 contained eggs. This little fly perforates the scale of the louse with its ovipositer and deposits one of its eggs, sometimes two, but never more than two. From this chalcis egg a greedy little grub is hatched, which feasts upon the eggs of the "bark louse." Other investigations have exhibited similar results, and it is exceedingly doubtful whether any *artificial* remedy could be devised that would be so skilfully, so constantly and so unerringly directed as this *natural* remedy. But the history of the animal world, and especially the insect world, is full of such instances, and it is well for us that it is so, for otherwise not only our agricultural and horticultural productions would become a prey to destructive insects, but our domestic animals, our fabrics, and even *ourselves*, might become the victims of their depredations.

"Harris's bark-louse" (fig. 17) is much smaller than the preceding, and different in the form and color of its shell, although similar in its general history, and is capable of doing a vast deal of injury when it becomes numerous, as I am able to testify from personal observation. The scales in

ects are an impure white, mostly of an oval or spindle shape, con-
eneath them from ten to twenty, or more, red, or deep pink eggs.
umb-nail or the blade of a knife is passed with pressure over
es, they will leave a red blood-like streak, which is visible to the
e. The eggs, in this latitude, hatch out about the beginning of
d the insects are similar in their form to the "oyster-shell louse"
ed. The females, however, secrete from their bodies the white
e which forms the scale or covering of the eggs, which, in struc-
mbles that of some species of spiders, only not so rigid, and is
more than a twentieth of an inch in length. Much has been written
shed in reference to the development of both these, but little of
uld come under the notice of a common observer. I have seen
ple and pear trees thoroughly cleaned of these insects by the ap-
of "neats-foot oil," though any similar oil or grease would do.
r insect, called also an "apple tree blight," *Eriosomæ lanigera*, of
n, is often found on apple twigs, situated in clusters around
of the twigs and suckers, growing from the trunk. These are a
ed louse, covered with a cotton-like substance, which is secreted
r bodies; but they do not form a "scale" or "shell," as the others
se three insects belong to the *order* HOMOPTERA, the two first to
ly COCIDÆ, and the last to the *family* APHIDIDÆ. Belonging to
order, and the *family* CICADIDÆ, is the "seventeen-year locust"—
eptendecim, which punctures the branches, depositing therein their
eggs, often to their great injury; but these occur so seldom that it is a question whether their prunings are not, in some cases, more beneficial than injurious in the end.

INSECTS AFFECTING THE LEAVES.

The *leaves* of the apple tree have many destructive enemies, but none perhaps that causes such an effective and universal blight as that of the "canker worm," for very often this insect is so numerous as to sear and destroy every leaf upon the tree. When the canker-worms have overrun an apple tree, the remaining leaves will present the dry and browned appearance, as those of a rosebush that has been devastated by the "rose-slugs;" for in the earlier periods of these worms, they do not entirely devour the leaves, but leave them in a skeletonized condition. Now, much as has been said about these insects, old, and pernicious as they are in their habits, it is quite possible that many people still do not really know what a *canker-worm* is, not even when they may have seen it, and if they have not this knowledge, they will therefore be fighting it at a great disadvantage. The canker-worm is the *larva* of *Anisopteryx vernata*, (fig. 18,) an insect that belongs to the nocternal section of the order *Lepidoptera*, an order which includes all the butterflies and moths. It is classified with the group or family *Geometradæ* or "geometers," which are also called "measuring-worms," "span worms" and "loopers," and produces only a single brood in a year. When these larvæ become once spread over an apple tree, it is then too late to contend with them successfully without perhaps injuring the foliage as much as they themselves do. Therefore, the proper course to pursue is to destroy the female *moth*, (fig. 19,) and prevent her from ascending the tree and depositing her eggs there. As she is entirely *without wings*, by care and perseverance this may be thoroughly accomplished.—The great body of these females issue from the earth during the first warm days of early spring, and crawl up the trunks of the trees and deposit their eggs on the branches in patches of from fifty to a hundred in each—each insect depositing from one to three hundred.

These eggs (fig. 20) are hatched, and the young worms rapidly developed, being ready to go into the ground as early as the first of June in this locality, or during the first half of that month, later or earlier than that period, according to latitude or the temperature of the weather. They remain in the ground in the *pupa* state during the whole summer, or until the following spring—that is, the great body of them do. But, as if determined to perpetuate their species, or to baffle all the means used for their prevention or extinction, a few issue from the pupa and commence traveling up the trees early in the fall, and continue to do so every warm and genial interval during the whole winter; therefore, the means to entrap them should be commenced also in the fall, and kept in an effective condition whenever the weather is soft and warm. For this purpose a broad band of any stickey substance or compound that will not dry or harden too quickly, should be smeared around the tree near its base. Bands of raw cotton, or circular troughs containing oils or other liquids, are more or less defective appliances, for these cannot be made to fit into all the crevices of the bark, and therefore apertures are left which either the females or the yong larvæ can crawl through, for it has been demonstrated that if the female is foiled in ascending the tree she will eventually deposit her eggs in the crevices below the band, and the young, when hatched, being very small, will find their way through unless this moat of defence is very perfectly constructed. These traps, during every warm interval in the winter, and until late in the spring, should be examined and, if necessary, the stickey substance—whether it be tar, or molasses, or birdlime—should be renewed, and the captured moths be destroyed if not already dead. It may be well to say, here, that the female which I exhibit on this occasion was captured in Lancaster city, on the 20th of November.

The "canker-worm," (fig. 21,) when fully matured, is about three-quarters of an inch in length, and is of various shades of ashen-gray in color, with a head peculiarly mottled and spotted with black and gray. Along the sides the color is deeper than on the back, and the underside is yellowish. It has six legs in front, and four fleshy prolegs near the hind end of the body, the intermediate space being without legs. When it moves, it reaches the body forward and takes a hold with its front or *pectoral* legs, and then draws the hind part of the body up with a jerk, the intermediate part being thrown up in a loop, or high arch, as if it was measuring; but this characteristic is common to all the "Geometers."

The perfect *female* is ash-gray, spotted with black, with the legs and *antennæ* rather long and slender, the former alternating with black and gray; the body scarcely half an inch in length. The males are winged, the wings expanding from an inch and a-quarter to an inch and a-half. The front wings are ash-gray, of various shades in different specimens, and are crossed with more or less faint black lines, and the hind wings are a silvery gray, the whole insect being that color beneath. The body of the male is much smaller than that of the female; the *antennæ* more robust and the hind legs longer. These males are readily attracted at night, by anything luminous, and hence may be captured in this way. In their flitting about they soon deprive their wings of many of the small scales on them, and hence it is difficult to obtain a perfect specimen. The eggs are very small; of a yellowish-white in color; slightly oblong, and in form not much unlike a miniature bird's egg. When the young are first hatched they are quite thin and thread-like, and reach maturity in about thirty days. These insects have not yet been so numerous in Pennsylvania as they have been in some of the eastern States.

But the Lepidopterous enemies of the apple tree are numerous, and I cannot possibly be expected to mention all of them in a single essay.—The "yellow-necked caterpillar" of the apple tree—*Eumelopona ministræ* Drury—is one that is frequently met with. These *larvæ* (fig. 22) cluster closely together on a single limb, stripping it entirely of its leaves, leaving the branches entirely bare; occurring in August and September, and when alarmed, they hold up the front and hind end of the body, adhering to the limb by the intermediate prolegs. In their last moult they are cylindrical in form, from an inch and a-half to an inch and three-quarters or more in length, of a dull yellow color, with black longitudinal stripes, a yellow spot on the first ring, and a prominent black head, with a few whitish hairs, very sparsely distributed over the body. The moth (fig. 23) varies from buff yellow to a light brown, expanding from two inches to two inches and a-half, and the front wings crossed with several brown or blackish bands, varying in number; the hind wings and abdomen are a dirty yellow color, and the head and thorax a dark brown. When these caterpillars are ready to transform they leave the tree at night, and go immediately into the ground and change to a *chrysalis*, so that if you see a cluster of them on your tree in the evening, and expect to destroy them the next morning, you may find that they have all disappeared. They remain in the *pupa* state all winter, and come forth in the moth state the following June, and are ready to deposit their eggs by the first of July; about the twentieth of the same month the eggs begin to hatch, and continue so daily, during the balance of the month. These eggs are deposited by the mother moth in patches of about a hundred each, on the branches of the tree. They require from the hatching of the egg, about five weeks to reach their full size, and although single brooded, they do not all reach maturity at the same time. Cutting off the branch and "firing" or scalding the whole brood, is about the best remedy—no danger of them running away whilst you are doing it.

The " American tent caterpillar" is another great foe to the apple tree, although its native tree is the wild cherry. But this food becoming comparatively rare, it has taken to the apple as its next choice. The eggs (fig. 24) from which these caterpillars are hatched, are deposited on the branches of the tree during the first half of the month of July, in the form of a bracelet or small cylinder around the branch, to the number four or five hundred, all standing endways, and glued together, and covered over with a brownish glue, remaining thus, through " wind and weather," until the following spring. The catterpillars come forth during the latter part of April or beginning of May, and almost immediately begin to form a web, similar to a spider's web, at the first fork below where the eggs were located. Under the shelter of this web or tent, they commence devouring the leaves, and it is increased in size as the worms increase. This tent is used as a place of concealment, and they always retire to it as soon as they are done feeding or during a rain, or intense heat of the sun. These caterpillars (fig. 25) reach maturity in about seven weeks, and they are then about two inches in length. Their heads are a shining black, and they have a whitish dorsal line, extending from end to end, on each side of which, on a yellowish ground, are numerous fine, interrupted black lines; lower down, these become mingled and form two broad longitudinal stripes, somewhat broken by the segmental divisions of the body. Lower still is a yellow line, and then fine black ones again on each side. The underside of the body is of a dusky color. On the eleventh segment is a small, blackish hairy wart, and the whole body is sparsely covered with short soft hairs. About the middle of June they begin to leave the trees, and independently hunt some out of the way nook or crevice, where they spin a loosely constructed oval cocoon, (fig. 26,) the meshes of which are filled with a sort of paste, which when dried and pulverized, forms a yellowish powder, resembling flour of sulphur.

The perfect "moth"—*Clisiocampa Americanæ*, of Harris, (fig. 27,) comes forth about the first of July, and belongs to the *family* BOMBYCIDÆ, or "Spinners," the same to which the common "silk worm" belongs. This moth expands from an inch and a-quarter to an inch and three-quarters—according to sex, the females being the largest—and is of a rusty red or brownish color, mingled with gray on the middle and base of the wings, with two oblique whitish lines across the front wings. The antennæ of the males are feathered on the one side, but those of the females are only slightly so, and are moreover much shorter than those of the males. These insects, although many of them are preyed upon during their larval period, by birds and several species of parasitic *Hymenopteræ*, still have the power of spreading very rapidly, and doing a great deal of damage where they are entirely neglected. And notwithstanding there have been many remedies published for their destruction from time to time, some of which have been almost *ineffectually* tried, yet they *can* be successfully "headed off" by a *universally adopted effort*, and this effort must first include the destruction of the eggs, during winter and spring, before the trees are in foliage—when they can be easily seen. These eggs should be removed and crushed, or boiled, or burned, if it involves the removal of the branch on which they are. If the eggs have not been removed at the proper season, the next thing is to remove and destroy the caterpillars. As these caterpillars only go out to feed twice a day—namely, in the forenoon and afternoon—they will be found "at home," morning, noon and evening; and as they go to bed early and rise late, ample opportunity is afforded to capture them. If you do not wish to loose the branch, attach a mop to a long pole, and saturate it with lime-wash, strong soap suds, cheap oil or turpentine; thrust this mop into the nest and turn it around until you wet all the caterpillars, which will be a "finisher" to them; also burn the cocoons wherever you find them, at the proper time.

Another, or rather two other moths belonging to the *family* BOMBYCIDÆ, namely, the *Gastropachæ Americana*, of Harris, and the *Gastropachæ Valleda*, of Stoll, are also found on apple trees, but they do not generally occur in great numbers, or at least have not, so far, in Pennsylvania. These are called "American lappet moths," from the larvæ being fringed along the sides with grayish hairy lappets or foot-like appendages. These moths are scarcely semi-cylindrical, and are of a grayish color, resembling the bark of the tree, laying closely to the branches all day, and may easily be mistaken for a slightly elevated tumor. When in motion, however, the former exhibits two bright red bands on the forepart of the body, and the latter a black band. They feed only at night, and do not form a webby tent. When full grown, the first named is about one inch and a half in length, and the last from two and a quarter to two and three-quarters. They are both yellowish beneath, and are otherwise marked. They spin themselves into brownish coccoons on the trees late in summer, and the moths generally come forth in the following spring. The *Americana* is a reddish brown, with notched wings, and the *Velleda* is a dusky gray, marked with white, expanding, respectively, about the length of their larvæ.

Still another apple-tree moth is the "American vaporer"—*Orgyai leucostigma*, of Smith & Abbot—belonging to the *family* ARCTIIDÆ. These caterpillars (fig. 28) mature about midsummer or later, and are slender in form, with pale, yellowish hairs, and black, pencil-like tufts at each end of the body, and on the front half are four short, thick tufts of hairs, cut off square on top of the body, and the head is red. About the first of August, (being then of various sizes, from an inch to two inches in length,) they spin themselves into very slight yellowish cocoons, through which the pupa may easily be seen, and in ten or twelve days thereafter the moths appear. The female (fig. 29) is then of a uniform dirty white color, and entirely without wings. She seems to be merely a matrix of eggs, (which are visible through the integument of her distended abdomen,) having a small head and thorax, and slender legs and *antennæ* attached to it. She never leaves the outside of her cocoon until she drops down from it dead. Before this takes place, however, she proceeds to deposit on it from one hundred and fifty to two hundred whitish eggs, which she covers over with a white frothy substance to protect them from the weather, which, when dry, becomes as brittle and gritty as the "cuttle-fish bone" which is used for cage birds. The male (fig. 30) is ashen gray, the front wings being crossed with dark wavy bands and a small black spot near the tips, expanding about an inch and a quarter; the body having a row of little black tufts along the back. Some of the cocoons of the females (fig. 31) may be found on the branches of the trees, but most of them are generally to be found sheltered on the under sides of fence rails, shrubbery, stables, outhouses, or any other sheltered or convenient place. Here they remain all winter, and are hatched out in the spring, when the young caterpillars immediately travel for the nearest tree, *apple* or otherwise, and commence devouring the leaves, and, under favorable circumstances, become very destructive. The same remedy recommended in the case of the "canker-worm" would apply to these species of *larvæ*, but by far the surest remedy is to gather the cocoons and destroy them. There are at least two broods of the *Vaporer* in a season, but the most numerous is the late one, which lays its eggs in the latter part of August and beginning of September.

The "lappets moths," before alluded to, unless the cocoons are searched for and destroyed, are not so easily observed, because their *larva*, from their peculiarity of form and color, are not so apparent, for they are able to elude, in a great degree, even the native vigilance of our feathered friends, the "insectivorous birds."

There is also a "bud moth" infesting the apple trees, *Spilonota oculata*, of Harris, belonging to the *family* TORTRICIDÆ. The *larvæ* of these moths are found on the trees in May and June, fastening the leaves together with silken threads as they begin to expand from the buds. The caterpillars live within these nests and feed upon the tender expanding leaves, and are small, pale, dull-brown worms, with shining elevated dots, upon each of which is one or more fine hairs, and a dark-brown head and neck. They change to a *pupa* in this nest and come forth about the beginning of July; small, dark, ash-gray moths, expanding about half an inch. The forewings are mottled with white and gray and tipped with brown, and have four little black marks, forming an eye-like spot, with various other markings. This is probably an introduced species, as it seems to be identical with a European species named *ocellana*.

The "Palmer worm," *Chætochilus pometellus*, of Harris, of the *family* TINEIDÆ, also attacks the leaves of the apple tree, and is sometimes exceedingly numerous, and when so, is also *very* destructive. They are small, pale, yellowish-green caterpillars, having a blackish stripe along each side, edged above with a narrow, whitish stripe and a dusky line on the middle of the back. They live and feed within a nest of eaten or skeleton leaves, drawn together by numerous silken threads, extending their area as they increase in size, and when the branch is jarred they drop down and hang in the air suspended by a thread. They change into *pupæ* in the same mass where they feed, and come forth about the end of July or beginning of August, small, ash-gray moths, with the forewings finely sprinkled with black, and have also four black dots near the middle, with several smaller ones along the hind margin, expanding nearly three-fourths of an inch.

Of course when these insects are present they can be seen, and when seen they should be immediately removed, and if this is done when they commence their colonies and the worms are small, by clipping off the infested branch and burning it, you extinguish the whole colony. But it seems that the enemies of the apple trees, and especially their leaves, are named "legions," for we have not only two other species of "Palmer worms"—the *Malifoliellus* and *Contubernalellus*, of Fitch, but also the "Red-humped prominent"—*Notodonta coccinea*, of S. & A., (fig. 32,) which is found in clusters, in August, eating off all the leaves of a particular limb, like the "Yellow necked caterpillar," before described. These are cylindrical prickly worms, (fig. 33,) striped with black and tawny yellow, and on each side with white and black. The head, and a hump on the fourth segment, is a bright red. They have two rows of black spine or prickels on the back, and smaller ones on the sides—the caterpillar is about an inch and a quarter in length. When mature, they come down from the trees and spin a cocoon under the leaves on the ground or slightly beneath its surface. The moth appears near the end of June, expanding from one inch to an inch and a quarter, is of a light brown color, the front wings streaked with dark brown. The eggs are laid on the underside of the leaf, during the month of July, in clusters, and are hatched at different periods, forming different broods or colonies, some as late as September.

Then there is the "fall web worm"—*Hyphantria textor*, of Harris, (fig. 34,) belonging to the *family* ARCTIIDA, which no doubt every one knows, because it often overruns whole trees, living in large colonies, and forming those thin cob-web like nests on the ends of the branches, and eating all the leaves within them, extending them as they increase in size. They are smallish caterpillars (fig. 35) of the social kind, about an inch in length, and are thinly clothed with whitish hairs, with black head and feet, pale yellow bodies, and a broad, blackish stripe on the back and beneath, varying greatly in size in the same society. After they attain their maturity, they loose their social character, and disperse and spin their cocoons (fig. 36) in crevices of the bark, or any other similar sheltered situations, where they remain in the pupa state all winter, the moths only appearing the forepart of the following summer, a milk-white "miller," without any dots or spots on the wings, the thighs tawny yellow in front, and the anterior feet alternated with white and black, expanding about one inch and a quarter. Many lamentations come up from different parts of Lancaster county and elsewhere, some years about this insect, and yet probably no one raises a hand to remove their nests when they see them. I have often seen naked apple limbs, with their fruit bobbing in the air, and destined never to come to perfection, the leaves all gone, which a little attention at the right time might have saved. Don't depend on solutions and fumigations, and signings, but inspect the trees closely and cut off the small branches early, for a colony of three or four hundred may be inclosed in a webbing not larger than your fist, when it first becomes visible. These insects, as well as nearly all I have described, also infest many other trees, such as the pear, the plum, the cherry, the quince, the willow, ash, &c., but they seem to prefer the apple. (Fig. 37) is the pupa of this moth.

The "apple aphis," *Aphis mali*, Fab., and the "apple-leaf aphis," *Aphis malifolia*, Fitch, are also very injurious insects, for although they do not devour the leaves, they puncture the tender ones at the ends of the branches and suck the circulating fluids so necessary to their healthy growth and beauty. These are small green plant lice, the females mostly without wings, (figure 38,) crowding themselves together in vast numbers, on the underside of the leaves, with their beaks sticking in them, pumping out the sap. The winged individuals (figure 39) have a black *thorax* and black knees and feet, with a row of black dots on each side of the abdomen. Dr. Fitch's species is larger than that of Fabricius, and has the abdomen, as well as the thorax, black, and also other distinguishing marks. The usual remedies for the destruction of *these*, and other species of *aphids*—for there are many of them, nearly every vegetable production of the tree or plant kind having species peculiar to them—are tobacco and sulphur fumigations, tobacco decoctions, soap suds and other alkalinous solutions, lime and saline washes, pulverized lime or even common road dust, applied after a shower, either natural or artificial, and are all *good* when skillfully applied, for these insects are so delicate in their organization and physical constitutions that they can't stand much, and a common hail or rain storm usually kills thousands, yea *tens* or *hundreds* of thousands of them, but their great *prolific* power still keeps up a fair supply. They are also preyed upon by birds, spiders and carniverous and parasitic insects. Indeed there is something very paradoxical, or at least anomalous, in the prolific procreative powers of these aphids, which is never void of interest to the commonest mind. They belong to the *ovo-viviperous* group in entomological classifications; that is, they are re-produced both by eggs and without eggs. Although the impregnated females of some species *must* survive the winter, in the earth, or under some other protecting cover, yet those which infest the apple, cherry, plum and other trees, deposit their eggs on the smooth bark of the young branches of those trees late in the fall, where they remain exposed to the chill winds of winter without injury, and are hatched out by the warm sun of the spring as soon as their food is provided. These early broods are all fertile females, and when mature they bring forth their young alive, one at a time, as cows do their calves. When these are mature *they* bring forth the same as their mothers have done, and thus go on all summer, even to the thirteenth or fourteenth generation, all being prolific *females* and not a *male* among them. Indeed some French and German entomologist have demonstrated that on removing them to a warm "green house," they have gone on thus re-producing all winter, to the thirtieth and fortieth generation, without the presence of a male. My friend, Mr. Jacob Stauffer, of Lancaster city, on one occasion found them re-producing in this way out in the open air, as late as the 5th of November. But usually, before the maturity and fall of the leaves in early autumn, a brood of *males* is produced, as well as *females*. Then fertilization takes place, in the usual way, the eggs are deposited as before stated and both sexes die, except the females of the hybernating species, and these eggs, thus impregnated, suffice to continue the species until the next autumn again. From *this* it would appear that this re-impregnation and deposition of eggs is only made necessary to bridge over an intervening cold winter, when there is a total absence of sustaining food, and not so much because of the *necessity* of re-impregnation, independent of such a contingency. Where these aphids are present they discharge a limpid sacharine fluid on the leaves below them, which glazes them over with the substance called "honey-dew," and which was once supposed to be sprinklings of "manna" coming down from the heavens during the night, but the light of science has dispelled all this long ago. This honey-dew attracts myriads of ants, flys, wasps and many other species of Hymenoptorous insects, and these lap up this substance and practically cry for "more" when the supply is exhausted. The ants usually act as sorts of herdsmen, and when the *dew* is sometimes too long withheld, they approach the aphids and "butt" them, something like calves and lambs do to make their dams "leave down their milk;" hence in England the common people call them "ant cows." These ants sometimes scrape the surface of the leaves so much as to injure them, but usually they do no other harm.

INSECTS INJURIOUS TO THE FRUIT.

The last insects I shall notice are those which injure the fruit, and happily they are not so numerous as those which infest the other parts of the tree. The most prominent among these is the "apple codling," *Carpocapsa pomenella*, of Linnæus, (fig. 40,) belonging to the *family* TORTRICIDÆ, and the *order* LEPIDOPTERÆ. This insect—or at least its qualities—are so well known to almost every one that it would seem unnecessary to say much about it, and yet, common as it is, there are many who cannot recognize the moth when they see it. In the apples of the present year—at least in Lancaster county—perhaps more than the one-half of them had at least *one* of the worms produced by this moth in them. These worms, (fig. 41,) when quite young, are white and have a black head, with a shield of the same color on the top of the first segment. After they reach maturity they are of various shades of pink, and the head and shields are brown. They are then about three-fourths of an inch in length and have little left of those minute warty concretions, surmounted by minute hairs, which distinguished their early development. The moth appears in June, and expands about three-quarters of an inch, and is one of the prettiest belonging to its family. The anterior wings are transversely streaked with wavy bands of ash-gray and brown, and a large brown spot on the hind angle, near the posterior margin, which is surrounded by a brilliant golden line, nearly shaped like a horse shoe. The hind wings and abdomen are a light yellowish brown, with a satin like lustre. The females then visit the apple trees, preferring the tender skinned early varieties, and deposit an egg or two on the flower ends of the young apples, which hatch in from three to five days, and the young worm begins immediately to bore in towards the core of the fruit, which it seems to make its head-quarters, excavating the surrounding pulp, as necessity requires. When the *larva* reaches maturity, it cuts a hole out of the side of the apple and makes its escape to little shelters under the scales of the bark, on the trunk and limbs, where it spins itself into a little white silken cocoon, (fig. 42,) covered with minute fragments of the bark, in which it changes to a yellowish brown chrysalis, (fig. 43,) and re-appears a moth, within the next ten days thereafter—for this insect is double brooded. Stragglers, however, of both the *larva* and the moth, may be found at nearly all seasons of the year. Some of these develop in houses, where apples are stored, and on the return of the warm spring, the moths are sometimes found on windows, trying to get out. Where it is deemed of sufficient importance to apply a remedy, by scraping all the loose scales of bark off the trunk and branches, these cocoons will be exposed, when they can be destroyed. This can, however, only affect the first brood. The second may be captured by tying rags in the forks of the branches—in which the worms will spin their cocoons—and examining them frequently, and gathering them and burning them. But if the fallen fruit is punctually attended to, and gathered up and fed to cattle or swine, perhaps more may be destroyed than by any other plan. The turning of hogs, cattle and sheep into the orchard during summer may also have a beneficial effect.

The "Apple midge"—*Molobris mali*, of Fitch—belonging to the *family* TIPULIDÆ, and *order* DIPTER—which includes the two-winged flies—also infests ripened and stored apples, and hastens their decay. The larvæ of these midges are slender, tapering, white "maggots," and change to a *pupa* within the fruit, from which are bred small black flies, about fifteen hundredths of an inch in length; the abdomen having a pale yellowish band on each of the segments or rather between them, and the wings are smoky, with purplish reflections.

The *larva* of the "Plum weevil"—*Conotrachelus nenuphar*—belonging to the *Curculio* family, also preys upon the apple; but the difference between this and the "apple-codling" is very readily perceived. The *curculio* is a footless grub, whilst the "codling" is a regular sixteen footed caterpillar. But enough has been said about this insect lately to fill two or three pretty large volumes, and still the insect keeps on in the "even tenor of its way," perfectly regardless of all the evil things published about it. As it *stings* the apple, and deposits its egg in it in the same manner that it does in the plum, the peach and the pear, the remedy most effectual in those fruits would be equally so in the apple.

In addition to this insect, they have lately discovered about the town of St. Joseph, in Michigan, a new and distinct "apple weevil," but I have never yet seen a specimen of it. It is smaller than the "plum weevil," and belongs to the genus *Anthonomous*, the species *quadrigibbus*, and the family CURCULIONIDÆ. It is pear-shaped in form, and has fluted wing-covers, with two wartlike elevations near the apex of each, and differs so much from the plum-weevil that it cannot be easily confounded with it.

The young apples are also much damaged by the "Rose-bug"—*Macrodactylus subspinosus*—a *Coleopterous* insect, which gathers on the trees in the month of June, sometimes in vast numbers.

The ripe fruit is also attacked by the common "Hornet"—*Vespa maculata*, Linn; the "Yellow Jacket"—*Vespa vulgaris*—and by the common "Wasp"—*Polistes fascata*, Fab. These insects eat holes in the fruit, and render it unfit for market. Also, by a species of true "Thrips"—*Phlæothrips mali*, of Fitch. This is a small blackish-purple insect, with narrow silvery-white wings, lying flat upon its back, and forms and occupies small roundish cavities, near the tip end of the fruit, hastening its decay, and causing it to drop from the tree.

Figs. 46, 47 and 48, *Geometra catenaria*, also occasionally are found on the apple it is said. In addition to the, already perhaps too long, list of insects affecting the trunk and branches, there is the "Divaricated Buprestis"—*Dicerea divaricata*—very similar in its history and form to the *Chrysobothris*, already described. The "Dog-day cicada," *Cicada tibicen*, affecting the branches; the "Mouldy Aphis"—*Callipterus mucidus*, Fitch. Three "tree-hoppers, namely: *Thelia cratægi*, *Ceresa bubalus* and *Ceresa taurina.* Three bugs, namely: *Arma grandis*, *Arma bracteata and Arma spinosa.* Three large moths, namely: The *Emperor*, *Attacus cecropia*, "Apple Sphinx"—*Sphinx gordius*—"Eyed Sphinx," and the "Large yellow butterfly"—*Smerinthus excæcatus* and *Papilio turnus*,as well as a number of smaller moths, as the *Notodonta unicornis*, *Lamicodes pithecium*, *Empretia stimula*, *Erannis tiliaria*, *Brachytænia malana*, *Orthosia instabilis*, *Lozotania rosaceana*, and a number of others, all affecting the leaves and tender branches, and the common names of which differ in almost every different State in the Union. It is a consolation to know, however, that these insects do not confine themselves exclusively to the apple tree, but appropriate a variety of vegetables, widely differing from each other. There is, for instance, the *Empretia stimula*, (fig. 44,) the most popular name of which is the "Saddle-backed hag moth," will feed indiscriminately on apple, pear, plum, cherry, quince, rose, honey-suckle, holly, cornleaf, plantain, cabbage, &c.; indeed it would be hard to say what it could *not* eat. (Figure 45 is the cocoon.) Another consolation is, that most of them do not become numerous, being of the solitary kinds; and in the last place they have many enemies, including man, the lower orders of mamals, birds and those of their own *insect* household. But their histories are all interesting and ought to be written, accurately illustrated, and distributed among the people, in a cheaper form than such books usually are.

In conclusion, allow me to make a few remarks in reference to the apple crop of Lancaster county last season, and the apple trade during the last three months of the year 1870—for I have made no observations or inquiry beyond the limits of that county—as an illustration of the value of that which we are all so anxious to cultivate, preserve and protect. So far as *quantity* was concerned, the crop was not an entire failure, but there was a great lack in *quality*. In my rambles through the county last season, and especially in the northern part of it, I found in many places a tolerably fair crop of apples and peaches, but the *quality* of most of them, and especially the former, was very inferior. They, generally speaking, were gnarly, warty and wormy, and could not possibly have been sold in competition with the fine apples brought into the county from New York and Ohio. I don't know what use could have been made of most of them, except converting them into *schnitz*—almost anything will sell in the form of *dried apples*, when green fruit is getting scarce. Still, we had some very fine apples in Lancaster county last season, but not near enough for home consumption; and you may form some estimate of the deficiency, when I inform you that from the first of October to the 31st of December last, over *ten thousand barrels* were brought into our county, and not *one thousand barrels* were in the hands of dealers on the 1st of January. Two firms alone, in Lancaster city, bought and sold *six thousand five hundred barrels* during the period above named. These apples averaged at least $3 50 a barrel. Some were sold at $4 00 and some at $4 50, and even higher for extra quality and condition. Some also sold for *less* than $3 50, but we may safely state this latter figure as the average price. This, in the aggregate, would amount to *thirty-five thousand dollars* paid out in three months by the citizens of Lancaster county for *apple-sauce*, in addition their local production.

These results exhibit the increasing importance of the apple crop, and the recognition of its usefulness, and that in contending with counter influences we are engaged in a most estimable occupation. What Lancaster county has been compelled to do, under the pressure of such circumstances, may have been the experience of other districts of our State, for the people everywhere *will have apples*, at any price. They have become almost as much of a necessity as "bread and beef;" and there are persons whose domestic establishments are conducted on such principles as to preclude the absence of this fruit. Why, only two or three years ago I saw a prominent fruit-grower in Lancaster county, one of whose ostensible functions was to teach men "how to grow apples," pay fifty dollars in "greenbacks" for *seven barrels of apples*. If this *fact* did not exhibit his want of ability to perform what he proposed to teach, it at least showed his faith in the utility of apples as an article of domestic use, and the importance of their preservation from the ravages of insects or any other casualties prejudicial to their culture.

Indeed the cultivation of apples had become such a precarious business in southern Pennsylvania for a number of years, and especially in Lancaster county, that many farmers seriously entertained the idea of removing all the apple trees from their premises, and making some other use of the land occupied by their barren orchards. This, in a general sense, would not have been advisable, although no doubt many of the old orchards might be removed and new ones planted in new and more favorable places with advantage. The opinion of many is that the "good old apple times" will come around again one of these years, and that there will be wisdom in anticipating it by new orchards of improved varieties of fruit; therefore our duty would seem to be to "*work and wait*" with patience.

But whilst we are " working and waiting," we are not to relax in " vigorous warring" against insect enemies—in vigilant watchfulness of their habits—in the development of their various histories—and in the application and effects of plausible remedies. Although, if possible, there should always be a discrimination in favor of insect friends; yet, I would not recommend a morbid exercise of that discrimination. If I could not destroy the enemies without also destroying the friends, I would not hesitate in letting *both* perish together. There does not appear to be much economy, humanity or common sense, in carefully picking and laying aside insect friends, and then destroying their natural food, in the meantime leaving them to starve to death for the *want* of food. Of course a judicious man would always discriminate between his friends and foes, if an *opportunity* were presented, and that he may know how to avail himself of such an opportunity, is the object of all practical essays on entomology—either printed or spoken—but as much of the *real* history and habits of insects are still undeveloped, and much depends on modifying circumstances, the ideas and suggestions contained in such essays are not presented as *finalities*. Entomologists need the co-operation of practical *fruit growers*, agriculturists, domestic economists and operative machinists, and these together need the co-operation and encouragement of local governments. Already many of the more advanced States in our Union have their departments of *Geology* and *Agriculture*, a few of general natural history, and especially *Entomology*. There is a vast amount of knowledge upon all these subjects, which, although in an advanced state of development, lacks the pecuniary means to place such knowledge in a cheap and practical form before the public.

A call was now made for the outstanding reports of committees.

Dr. Suesserott submitted the report of the committee on the examination of fruit, &c.

REPORT.

To the President and members of the Pennsylvania Fruit Growers Society:

The committee upon examination finds: Thirty-nine exhibitors, contributing 110 plates of apples, 4 of pears, 1 of grapes, 1 collection of seedling raspberries, in jars; 1 collection of lemons and oranges, 1 collection of nuts, 2 varieties; 4 exhibitors of wines, &c. The committee would call the special attention of the society to the following fruits, among the many fine specimens exhibited:

Ladies' Blush, or Bullock Pippins, by many erroneously called Maiden's Blush, from several exhibitors; the York Imperial and York Stripe, from many exhibitors; also some very fine specimens of Grimes' Golden Pippin, from S. Marshall, of Cleveland, Ohio, and some fine Duchess Bordeaux pears, from Dr. Houghton, of Philadelphia.

J. L. SUESSEROTT,
SAMUEL W. NOBLE,
FRANKLIN TAYLOR,
W. P. BRINTON,
WILLIAM PARRY,
Committee.

The following gentlemen were appointed a committee for procuring passes over the railroads: S. W. Sharp, J. R. Eby, Alexander Harris.

Dr. Taylor offered a resolution to the effect that a return of thanks be made to the railroad companies for past favors in the way of passes, &c.

The question of applying to the Legislature of Pennsylvania for aid in the publishing of reports, &c., was brought up, and the following petitioning committee appointed:

Chairman, Dr. Franklin Taylor, West Chester; William G. Reed, Franklin; Charles Kessler, Berks; Judge Wentz, Cumberland; Henry Shellenberger, Dauphin; J. E. Mitchell, Thomas Meehan, D. W. Herstine, Philadelphia; E. Satterthwait, Montgomery; S. B. Heiges, York; William A. Fraker, Huntingdon; Abner Hoopes, Chester; F. F. Merceron, Columbia; J. Knox, Allegheny; William Panabaker, Mifflin; B. M. Ellis, Lycoming; Solomon Bernheysel, Perry; John Burkholder, Adams; Levi S. Reist, Lancaster.

Dr. Taylor moved to ask of the Legislature, in addition, a Department of Agriculture, Mining and Geology for Pennsylvania.

Mr. Meehan seconded this motion, which was agreed to by the society, and entered on the minutes in resolution, as follows:

Resolved, By this society, that Dr. F. Taylor, of Chester county, be authorized to present to the State Legislature the views of said society in regard to the importance of establishing a Department of Geology and Mining, as also a Department of Agriculture, as well as to request a small appropriation in behalf of this society, for the publishing of its reports, &c.

Resolved, That this society respectfully ask the House of Representatives for the use of their Hall, at a time suitable for said committee to convene.

Upon motion of Mr. Engle, the President was given the power to appoint *ad interim* committees.

All business being now finished, Dr. Taylor moved an adjournment, to meet next year in Philadelphia.

And so closed, in the words of President Hoopes, one of the most successful meetings of the society since its first one, in 1859.

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